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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

N E W S L E T T E R

FOR NOVEMBER 1934

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FIELD LABORATORIES AT BELTSVILLE, MD.

Considerable progress has been made this fall in the construction of the laboratories on the Bureau of Entomology and Plant Quarantine area at the Beltsville Research Center. These laboratories are located on a plot of about 60 acres, approximately 1.7 miles from Beltsville, and are grouped about a small lake. The buildings under construction at the present time consist of a main laboratory, a laboratory head house, four greenhouses, and two mushroom houses. The main laboratory is 110 feet long by 41 feet wide and consists of two stories and a basement, the latter being two-thirds above the ground. There are 31 laboratory units in the building, each approximately 16 feet square, together with four constant-temperature rooms, each 7-1/2 by 15 feet, and three cold-storage rooms, providing approximately 5,000 feet of refrigerated space. The building is of concrete and cinder-block concrete with brick facing. It is practically fireproof in construction, the windows having metal frames, and the doors and door jambs being of metal. The floors of the first two stories will be asbestos tile laid on cement. The floor of the basement will be cement, except for the honey laboratory, which will be tiled. The roof is to be of slate. Provision has been made for a heating plant in the basement and also for a shop. The foundation of the building is completed and the walls are completed nearly to the second floor.

The greenhouses and the head house are located about 250 feet from the main laboratory. The laboratory head house is approximately 80 feet long by 35 feet wide and comprises eight rooms on the first floor. The boiler room, containing the heating plant for the greenhouses, is located in the basement. A spacious attic, 45 by 35 feet, is over the central part of the building. Five laboratories are provided, each of which is about 17 by 15 feet, together with potting room, storage space, and a treatment room for general use. The building is of brick with slate roof, the walls being unfinished brick on the inside, with a beamed ceiling. The flooring of the laboratories is of asbestos tile over concrete.

The greenhouses are four in number, three of them being 75 by 29 feet and 7 feet high at the eaves. The fourth is 20 feet wide and is divided into nine compartments, eight of which are 8 feet 4 inches by 14 feet 4 inches in size, the partitions being of glass. The compartments open into a common glazed passageway. A small propagation house 17 feet long by 6 feet wide is provided.

The mushroom houses are 32 by 18 feet, two stories high, and are of cinder block, stucco on the outside with brick quoins on the corners and doorways. The roof is of slate with the exception of the boiler room, which is between the two buildings. These buildings are enclosed, the roof being in place, although the heating equipment has not yet been installed.

Consideration has been given to the ground allotted to the Bureau and provision made for locating additional structures that may be required in the future.

L. A. Hawkins, in charge of the Division of Control Investigations, is acting as the Bureau's representative in supervising this construction work.

FRUIT INSECT INVESTIGATIONS

Parasites control woolly apple aphid in Washington.--In 1930 and 1931 M. A. Yothers, of the Wenatchee, Wash., laboratory, introduced the parasite Aphelinus mali Hald. into the Wenatchee district, in the hope that it would be of value in controlling the woolly apple aphid (Eriosoma lanigerum Hausm.), which is an important factor in causing perennial canker in apples. These parasites were first established in a large cage built over an apple tree. The species has now spread over the greater part of the principal apple district in this vicinity. In many of the orchards it has already effectively checked the woolly apple aphid.

Screening raisins reduces raisin moth infestation.--Using a soil sifter of the rolling type developed at the Alhambra, Calif., laboratory, equipped with a screen of 1/4-inch mesh and with 2 chains for stopping the moving sieve abruptly at both ends of the track, H. C. Donohoe, of the dried-fruit insects laboratory at Fresno, attempted to reduce infestation in three varieties of raisins. The fruit was screened after drying on spread trays and subsequent drying on stacked trays or rolled paper trays had been completed. The numbers of larvae of Ephestia figulilella Greg. per ton, together with the percentages of reduction, are shown below.

Variety	Before sceening	After screening	Reduction
	Number	Number	Percent
Thompson Seedless	41,693	11,587	72.2
Thompson Seedless (paper trays)	2,898	167	94.2
Thompson Seedless	89,075	31,152	65.0
Muscat	22,296	16,333	26.6
Sultana	133,302	49,201	63.1

Pontamine blue dye is toxic to peach borer eggs.--Oliver I. Snapp and J. R. Thomson, Jr., of the peach-insect laboratory at Fort Valley, Ga., found a year ago that eggs of Synanthedon exitiosa Say deposited on blue blotting paper used in the insectary work failed to hatch. It was learned from the manufacturer of this paper that one of the important constituents of the dye used was known as "pontamine blue." During the 1934 season, experiments were conducted with this dye and it was found that it killed 96 percent of the peach borer eggs when used at a strength of 64 g to a gallon of water.

Northwestern apple growers use codling moth bands.--E. J. Newcomer, of the Yakima, Wash., laboratory, found in the course of a recent survey that 40 percent of the apple growers in the Yakima district are now using chemically treated bands for control of the codling moth. He also noted that not more than half a dozen of the orchards in the Yakima and Wenatchee districts show evidence of having been banded in 1933 but not in 1934, indicating that very few growers discontinue the practice after once adopting it.

MEXICAN FRUIT FLY CONTROL

A Mexican fruit fly taken in Texas.--An adult Mexican fruit fly was trapped in a grove north of San Benito, Tex., the latter part of the month. This fly was taken after high winds from the southeast had prevailed for several days; it was captured in a grove having scanty foliage and very little fruit; and during the same week a number of specimens were taken in Matamoros. These facts substantiate the theory of reinfestation of valley groves by wind-drifting flies from Mexico. A slight increase over the preceding month was noted in the numbers of Anastrepha fraterculus Wied., A. serpentina Wied., A. sp. "X", and A. pallens Coq., taken. Two specimens of an undescribed Anastrepha, in all probability a seed feeder, were also taken in the traps. The first papaya fruit fly taken in several months was trapped in the Pharr district.

Fruit flies collected in Mexico.--Six adult A. ludens were trapped in Matamoros. Three of these were females but none were gravid. Inspections of fruit imported to the Matamoros market resulted in the taking of larvae of A. ludens, A. striata, A. fraterculus, and a species of Rhagoletis. Of interest in showing a possible method of dispersal of the fruit fly, was the finding of 7 larvae and 1 pupa in the cracks of the floor boards of a car in which oranges had been transported to Matamoros from Monterrey. The traps located on the ranches along the Mexican side of the river from Matamoros to Rio Rico, were not operated during the month on account of the unsettled conditions due to the agrarian troubles.

Fruit-fly inspection station opened.--The road-traffic inspection station, 35 miles north of Edinburg, Tex., was opened on December 9. This station was operated on a 24-hour daily basis. There was a steady movement of fruit shipped from the valley throughout the month, a total of 1,101 carloads having been moved by rail and truck. Confiscations were light.

DATE SCALE CONTROL

Date scale work nearing completion.--During the month of November inspection was continued in the infested districts in the Coachella and Imperial Valleys, Calif., and surveys were made there and at Yuma, Ariz., to determine the amount of clean-up work remaining to be done. No parlatoria date scale has been found in the Imperial Valley since February 1934, and on only one property since March 1933. In the Coachella Valley, the largest date-growing area, the last scale was found in November 1931; in the Salt River Valley in October 1932; and at Yuma in December 1930.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Drought in Southwest reduces stored-grain pests.--R. T. Cotton, Manhattan, Kans., reports that stored grain in the Southwest appears to be in better condition from the standpoint of insect infestation than it has been for 4 years. This is apparently due to the extreme hot and dry weather of the past season. Wheat coming into the elevators is extremely dry. Weevils will not breed in wheat having a low moisture content.

Cadelle appears early in Kansas mills.--According to Geo. B. Wagner, Manhattan, Cadelle larvae are beginning to show up in the monthly collections from the machinery of flour mills in the Kansas milling area. Ordinarily this insect does not appear in numbers until midwinter or later, when it often outnumbers the flour beetles.

Many chinch bugs are hibernating in Kansas.--W. T. Emery, Manhattan, reports that population counts of chinch bugs per square foot of sod taken the latter half of November indicated that a large number had found protection in winter quarters. Sixty-two 1-sq. ft. samples were taken in 13 counties. Two counties near Manhattan produced an average of 14 bugs per square foot; 5 counties of northeastern Kansas, an average of 45 per square foot; and 6 counties of southeastern Kansas, 68 per square foot. The two highest counts were 576 in Crawford County, in southeastern Kansas, and 365 in Marshall County, in northeastern Kansas. The samples were taken from roadsides.

New nematode attacks corn ear worm larvae in New Jersey.--W. H. Larrimer, Arlington Farm, Va., reports: "While examining the ear worm hibernation cages at Moorestown, N. J., on November 26, I found that in one of the cages practically all of the pupae had been killed, apparently by some disease. I sent some of these pupae to Vera K. Charles, of the Bureau of Plant Industry, for examination. She reported that they were heavily infested with nematodes and sent the material on to G. Steiner, who states that this is a very interesting find and possibly a new species of nematode. Dr. Steiner says: 'Before long we will be able to send you a description of the new form, which we now believe is different from the parasite of the Japanese beetle, although closely related to it. The pupae submitted are full of nematode larvae, which we think will be suitable for further infection experiments.'"

Hessian fly resistance inherited in wheat hybrid.--W. B. Cartwright, Sacramento, Calif., reports that, in cooperation with the Bureau of Plant Industry, a cross between Dawson, a wheat variety resistant to hessian fly in California, and Poso, a susceptible wheat, was tested under field conditions in 1934. On a factorial basis, a tentative interpretation of the genetic data from 185 F_3 rows indicates the probability that two factors and a 15 to 1 ratio are involved in the cross. The data also indicate complete susceptibility to be recessive. Stocks from 65 resistant hybrid rows become bases for back-crosses and for continuing the breeding for a Poso wheat that will be resistant to the fly. The postulated two factors for resistance have not definitely been identified. It is possible that lines having *A* and *B* factors may be obtained in the back-crosses already made in 1934.

Forecast of 1935 grasshopper infestation in California.--According to C. C. Wilson, Sacramento, 496 stops have been mapped, and 4,415 acres of grasshopper egg beds located in California. The highest count of egg pods per square foot was 1,100, or approximately 29,700 eggs. The survey indicates that 100,000 acres of infested territory will require poisoning in 1935. Approximately 500 tons of bran will be necessary to hold the grasshoppers in check. Larvae of Bombyliidae and Meloidae have, in some areas, destroyed large numbers of grasshopper eggs; a maximum of 68 percent was observed attacked by larvae of the bee fly.

Melanoplus mexicanus Sauss. breeds from March to November in Imperial Valley.--Mr. Wilson also reports that observations made from November 7-10 showed the grasshoppers in all stages of development. It becomes more apparent that there are at least two generations, and probably more, as adults and nymphs have been present from April to November. It is believed that the generations may be entirely dependent on soil moisture (obtained only through irrigation), as the temperature from March through November is sufficiently high to cause hatching of the eggs.

Method of preserving tin salve boxes.--F. F. Dicke, Arlington Farm, Rosslyn, Va., says that the common tin salve box is widely used at many laboratories for collecting and rearing insects. One of the objectionable features about these boxes is their rapid deterioration from rust, especially when not in use. Rusty boxes are always undesirable in rearing insects and are difficult to open. To prevent rusting a self-emulsifying spray oil has been employed for 3 years on salve boxes used for rearing larvae. The boxes are boiled from 10 to 15 minutes in water to which the self-emulsifying spray oil has been added at the rate of 15 cc per gallon. The boxes and lids are then spread out to dry, the evaporation of the water leaving a thin film of oil. Boxes treated in this way have been used repeatedly for rearing purposes with no deleterious effect to larval development from the oil film. The oiled boxes may be opened and closed much more rapidly and with greater ease, thus minimizing injuries caused by ragged edges on the boxes and lids. The chief benefit, however, is the preservation of the boxes while in storage.

Parasitization of wheat joint worm in Oregon.--T. R. Chamberlin, Forest Grove, Oreg., reports that in the Molalla colony in 1934, infestation by *Harmolita tritici* Fitch is the lowest so far recorded. Late in November, parasitization of *H. tritici* in a field near the heart of the Molalla colony having an infestation of 6 percent of the culms was analyzed. It was encouraging to find that, notwithstanding the low infestation, parasitization had not been reduced, but was higher than previously noted. The material showed the following conditions:

Average *Harmolita* galls per infested joint	6.3
Survival of *H. tritici* in galls	11.7 percent
Parasitization by *Ditroponotus aureoviridis* Crawf.	37.8 percent
" " *Eurytoma parva* (Gir.) Philips	30.2 percent
" " *Eupelmella vesicularis* Retzius	1.7 percent
" " *Eupelmus allynii* French	11.7 percent
" " *Decatoma amsterdamensis* Gir.	4.2 percent
" " other and/or undetermined parasites	2.5 percent
Total parasitization	88.3 percent

The number of additional *Harmolita* destroyed by *Eurytoma* that entered more than one cell increased the destruction by this species to 42.8 percent of the original number of *Harmolita* present and increased the total destruction by all the parasites to 90.7 percent. *D. aureoviridis* was secondary in 13.3 percent of the cases, all on *E. parva*. *E. allynii* was secondary in 57.1 percent of the cases, all on *E. parva*, *E. vesicularis* was secondary in half of the cases, all on *E. parva*. *D. amsterdamensis* was secondary in at least 40 percent of the cases. By including the *Eurytoma* destroyed by secondaries; as well as those that entered more than one cell, 53.9 percent of the original number of *Harmolita* were destroyed by *Eurytoma*. Record of parasitization in this material differs from other records of the last few years in that it shows an increase in parasitization by *D. aureoviridis* and *E. allynii*. Stubble heavily infested with jointworm was very scarce in the spring of 1934 and it is believed that this increase in parasitization by *D. aureoviridis* was caused in part by parasites issuing from various grasses, where this species parasitizes other *Harmolitas*, especially velvetgrass, which is very abundant in the neighborhood of the field studied. The increase in *E. allynii* was due in part to those issuing from hessian fly.

JAPANESE AND ASIATIC BEETLE INVESTIGATIONS

Disease among Japanese beetle larvae.--During the past month the work of isolating the infecting organisms from field-collected grubs at the Moorestown, N. J., laboratory, has been continued by I. M. Hawley and S. R. Dutky. Several additional organisms have been shown to be pathogenic to the Japanese beetle larvae upon direct injection into healthy larvae. Field tests to determine the survival of the pathogens in the soil and the degree of infection of healthy grubs by the organisms have been started. Soil inoculated with approximately 10 billion cells of each of 9 pathogenic organisms were sprinkled over the grubs and the plots were then filled in. Three uninoculated plots were used as controls. Suspensions of the blood of milky grubs tested in the laboratory in saline solutions showed that there may be at least 15 billion spores of the causal organism in the body fluids of a single grub. Slants of blood agar and nutrient agar were inoculated with the saline blood suspension, and after several days at 30° C. (86° F.) discrete dewdrop colonies developed on the blood agar, whereas the nutrient-agar slants remained free from growth. Microscopic examination of the growth showed it to be made up of long, slender motile rods. To date these have not sporulated, therefore they could not be identified with the spindle-shaped spores from the milky grubs. Inoculations into healthy grubs were made too recently to shed any light on the problem. Fifteen healthy grubs from Philmont, Pa., which had been observed for 18 days to make sure that they would not develop the disease spontaneously, were used in an inoculation experiment to show that direct injection of the causal organism would produce the disease. Five grubs injected with 0.01 cc of a 0.5-percent saline solution served as controls, and 10 grubs were injected with 0.01 cc of a 0.5-percent saline suspension of the blood from a milky grub (the suspension containing 25 x 10^7 spores per cc). No change was observed in the grubs injected with the saline suspension until 1 week later, when 7 out of the 10 grubs showed a slightly milky appearance. To date, 10 days after injection, the 7 grubs appear distinctly milky.

Method for conducting larval surveys in the field.--W. E. Fleming and F. E. Baker, Moorestown, report that this project was undertaken in September to determine the proper procedure for conducting larval surveys in the field. Four 2,500-sq.ft. plots were surveyed and the number of larvae found in each square foot were plotted on a large chart. Two of these surveys were made in pasture and two in cornfields. The data have not been completely analyzed but the following results are apparent: (1) The relative standard error of the mean is greatly influenced by the size of the individual unit used in the survey and the percentage of the area surveyed. It is apparent from our observationsthat the most accurate survey is obtained with the square-foot units. (2) Using the square-foot units, it was found that the relative standard error of the mean was a function of the area surveyed and of the average number of larvae per square foot in the plots. It is planned to complete this work in the near future, when it is expected that the accuracy of the different methods of surveying can be definitely determined.

Propagation of Tiphia popilliavora Roh.--T. R. Gardner, Moorestown, reports that laboratory propagation of the Korean strain of the Japanese beetle parasite T. popilliavora and crosses of this strain with the Japanese form of T. popilliavora, started on September 13, was brought to a close on November 12. From 235 Korean-strain females mated with Korean-strain males a total of 16,276 parasitized grubs were obtained, an average of 69.3 eggs oviposited per female; from 17 Japanese-strain females mated with Korean-strain males, a total of 1,082 grubs were parasitized, an average of 63.6 eggs oviposited per female; from 5 Korean-strain females mated with Japanese-strain males a total of 366 parasitized grubs were obtained, an average of 73.2 eggs oviposited per female. The life of the females while in actual oviposition under laboratory conditions ranged from a few days to 57 days for the Korean strain and from a few days to 45 days for the Japanese strain. The highest total number of eggs laid by one Korean-strain female was 126, and the highest total laid by one Japanese-strain female was 109. Reporting on the Yokohama strain of this parasite, M. H. Brunson, E. B. Parker, and R. T. White state that on October 19 and November 1 shipments of adult T. popilliavora, collected at three different locations in the vicinity of Yokohama, were received from Japan. As the habits of the insects at each of these localities are different and also slightly different from the habits of the species first collected at Koiwai in 1920, the recent material was considered to represent distinct strains of this species. It is hoped that this material will be better adapted to conditions in this country than the strain which has been established for some years, originally collected at Koiwai. Due to the lateness of the arrival, it was decided that the adults would not be liberated but would be used in propagating material for use next year. The methods used in propagation were fundamentally the same as those used in propagating other Tiphia, the only variation being that breeding cans were examined every second day instead of daily, because of the large number of females it was necessary to handle. From a total of 3,241 females, 34,518 parasitized hosts were obtained.

JAPANESE BEETLE CONTROL

Mild weather stimulates nursery inspection.--Mild weather during the latter part of November resulted in considerable activity in the nurseries and was largely responsible for continued demands for inspection and certification of stock. Two temporary inspectors located at Westfield, Mass., inspected nursery stock for winter storage. Weather conditions permitted strawberry plant growers on the Eastern Shore of Maryland to continue shipments of certified material. Nursery activities in New Jersey have kept all inspectors busy. In southern New Jersey it was necessary to add several inspectors. Nursery stock continued to move from the Philadelphia area under certification, although in small amounts and mostly to southern points. At the end of the month, plants for Christmas sale were moving between dealers, thus adding to the seasonal demands for certification.

New methods of treatment being devised for ridding potted stock of Japanese beetle.--The Japanese beetle quarantine and research organizations are cooperating with a number of New Jersey nurserymen and greenhousemen in experiments to determine the effectiveness of paradichlorobenzene in killing Japanese beetle grubs infesting potted stock.

Elm sanitation survey in Dutch elm disease control area.--Tagging of dead and more than half dead elm trees in the tri-State work areas progressed satisfactorily during November. It is planned to remove such trees before the next spring emergence of beetles. In New York, 14,048 dead and dying elms have been located and tagged for removal this winter. Removal of 121 trees of this character already has been accomplished. These 14,169 trees constitute about 60 percent of all dead and dying elms in the infected area and the 10-mile protective zone of New York. In New Jersey, at the end of November, 3,645 dead and dying trees had been located and marked, 826 of these having been found in an area of less than 20 square miles. The latter elms are located in woodland and swamp areas where it had been anticipated the greatest number of dead elms per square mile would be found. In the New Jersey State control organization, four supervisors were assigned to interview owners of diseased elms and obtain releases for removal of the trees. Dead and dying elms located in Connec cut in November brought the grand total for that State to 3,301.

Inspection of evergreen products requires enlarged gypsy moth force.--Individual inspection of each tree in carload shipments of Christmas trees required the assignment of 21 temporary inspectors to inspection centers in the lightly infested gypsy moth area of Maine, New Hampshire, and Vermont. The trees were inspected after their assembly at railroad loading points. Nine temporary inspectors were stationed in southern Vermont, where they inspected lots from which evergreen boughs were cut. For the purpose of determining that laurel use in the manufacture of Christmas wreaths, roping, and set pieces originated at certified lots, a single inspector was stationed at New Salem, Mass., and two inspectors in southern Vermont.

Shipper and common carrier prosecuted for gypsy moth quarantine violation.--In the Bureau's first prosecutions for violations of the gypsy moth quarantine in over 10 years, Fred E. Grant, of Cherryfield, Maine, and the Maine Central Railroad Company were each fined $25 for shipment and transportation on September 29, 1934, of 17 cords of hardwood from Harrington, Maine, to Elkins Park, a suburb of Philadelphia, Pa. While inspecting a carload of wood for the same shipper, the district inspector at Bangor overheard a conversation that led him to investigate a carload previously moved without inspection. The necessary legal papers were turned over to the United States Attorney on November 5 and the defendants were arraigned and fined at Bangor on November 13.

Increase in gypsy moth egg clusters removed from inspected products.--Over twice as many gypsy moth egg clusters were removed from products inspected in November 1934 as in the same month of 1933. This year's November total is 432 egg clusters. In the same month last year, 210 egg clusters were removed and creosoted.

Stubble count determines extent of corn borer infestation on Long Island.-Inspections are now in progress by the corn borer inspector stationed on Long Island of cornfields throughout the different sections of the island. In thoroug ly canvassing the island, five fields in each section and 125 stubble in each field will be examined. The stalks removed for fodder were cut fairly close to the ground this year. Nevertheless borers are quite evident in many fields. It is anticipated that the heaviest infestation will be found on the eastern end of the island, as dahlia plants inspected in that section contain the largest number of borers. In the three most heavily infested fields found during the month the infestation was as follows: 22 borers in 125 stubble examined in a 12-acre field; 24 infested stubble among 125 selected at random in a 3-acre field; and 16 borers among 125 stubble examined in another 3-acre field.

Cannery appeals to corn growers to rid their fields of borers.--A prominent canning factory located at Essex Junction, Vt., sent each of its growers the following letter: "During 1933 and 1934 there has been a considerable infestation of corn borers in the corn planted for the Essex Junction factory. It is to your interest, as well as to ours, that all possible measures should be taken to keep corn borers from increasing. One of the best ways to control the borers is to destroy them in the fall." After mentioning various measures of control, the letter concludes: "A little extra care this fall may mean a great saving to you and to your neighbor in the next year's crop. Please cooperate with us and with the Vermont Department of Agriculture in doing everything possible to destroy the borers in 1934 and thus preserve the 1935 corn crop."

FOREST INSECT INVESTIGATIONS

Pine tip moth in Illinois.--R. C. Hall, of the Columbus, Ohio, laboratory, reports that during a survey in the Central States region last summer, A. G. Chapman, of the Central States Forest Experiment Station, noted numerous instances where the pine tip moth (Rhyacionia frustrana Comst.) was damaging planted shortleaf and loblolly pine. All the evidence points to the fact that this planting stock was infested before it was shipped to Illinois, the nearest native pine being about 60 miles distant. One of these areas is a 5-year plantation of 5-year-old shortleaf and loblolly pine at Elizabethtown, Ill. The infestation in this plantation is very heavy, about 95 percent of all tips and laterals being infested. Random sampling indicates populations of about 12 pupae per tip, which means about 350 per tree. The average height of these trees is only about 4 feet. An attempt is being made by the Bureau to control this local infestation by the removal of all infested tips during the coming winter. Time records on the work indicate that by the use of local labor 30 trees per man-hour can be treated.

Black locust injured by cereal and forage pests.--T. E. Snyder, of the New Orleans, La., laboratory, reports that during the last few years millions of black locust seedlings have been grown in plantations in the Southern States to be used in the various emergency planting projects. In this connection a number of crop pests, such as the three-cornered alfalfa hopper (Stictocephala festina Say) and the lesser cornstalk borer (Elasmopalpus lignosellus Zell.), formerly unknown as enemies of this tree, have been doing considerable damage. In 1933 one nursery that was planted to provide 200,000 seedlings produced only about 25,000, because of the feeding of a small membracid.

Anobiid beetle damages furniture.--Dr. Snyder also reports that an interesting European anobiid has recently been damaging furniture and the woodwork of buildings in Florida and Louisiana. Its work is often confused with that of dry-wood termites. A short publication has been prepared on this insect.

Insect attack in cutover lands in California.--J. M. Miller, of the Berkeley, Calif., laboratory, reports that during the summer of 1934 a study of the insect problems that develop in the growing stock left on the ground after the mature timber has been cut, was carried on by the Berkeley laboratory, in cooperation with the Forest Service of Region 5. Areas in central and northern California, where logging had been done from 5 to 40 years ago, were included in these studies. A total of 30 sample plots, covering 12,000 acres of land that had bee logged by various methods of regulated cutting, were covered by intensive surveys Results have shown that in the pure ponderosa pine type the hazard from bark-beetle attack to reserve trees, left as cover after logging, is very high. On some areas nearly all of the larger trees left by the lumbermen have been killed within 15 years after the area was logged. Still another set of entomological problems was found in the insects which attack the younger trees of the second-growth class. Most important of these problems was the injury caused by a pine tip moth, Rhyacionia pasadenana Busck. The damage occurs mainly on reproductions up to 6 feet in height. Repeated killing of the terminal shoots markedly deforms the trees. This insect is most prevalent in open stands of pine reproduction that are unshaded by mature trees.

Long growing season of 1934 favors western pine beetle.--Brood development in the spring of 1934 started in California about 1 month earlier than normal. In northern California the third seasonal generation reached the overwintering stage, while in central California three generations were completed and a partial fourth has reached the overwintering stage. Development for 1934 exceeds by one generation any previous records for seasonal development. These favorable conditions in 1934 resulted in the rapid building up of western pine beetle epidemics, particularly in northeastern California. In many areas the beetle population has built up to epidemic conditions, which now exceed the infestations that preceded the heavy winter-kill of December 1932.

Lodgepole pine needle miner shows rapid spread in Yosemite.--National park surveys during September 1934 indicated that the needle miner Recurvaria milleri Busck greatly increased the extent of the infested areas in the high Tuolumne watersheds during the flight season of 1933. As these new epidemics will undoubtedly extend the areas of dead lodgepole forests within the park, the forest cover on the intensively used camp-ground areas around the Tuolumne Meadows is now threatened. Because of the seriousness of this problem, the Berkeley laboratory continued experiments during September 1934 in an attempt to develop a method of protecting individual trees from defoliation. Light oils applied during the early stages of attack in the fall of 1933 gave good control, mortality as high as 97 percent being obtained. Applications during the second season of feeding in 1934, after the larvae were half grown, were far less effective, causing a mortality of only 22 percent.

Pine shoot moth reduced in Connecticut.--H. J. MacAloney, of the New Haven, Conn., laboratory, reports that in connection with the C. C. C. project for control of the European pine shoot moth (Rhyacionia buoliana Schiff.), the fall inspection of plantations by the Connecticut Agricultural Experiment Station is under way. Up to November 15, 51 plantations totaling 593 acres have been inspected and in 42 of these no larvae were found, while the infestation in the remaining 9 was reported as very light. In 1933 these plantations were reported as 9 heavy, 10 medium, 26 light, and 6 having no infestation. The very noticeable decrease in infestation in these plantations was caused partly by death of the larvae during the severe winter and partly by the very efficient control work. It is believed that this situation prevails throughout the northwestern, northeastern, and eastern parts of the State. Control was not undertaken in the southwestern part of the State, in New Haven and Fairfield Counties, and the infestation there is still noticeable.

Tree medication for control of the mountain pine beetle.--W. D. Bedard, of the Coeur d'Alene, Idaho, laboratory, states that for several successive years emergency appropriations made it possible to experiment more extensively with tree medication as a possible means of controlling the mountain pine beetle in western white pine. The first project was instituted in 1933 to ascertain whether the method of injection could be applied successfully by ordinary unskilled laborers, and to test the practicability of the method under actual control conditions. The results showed that the technic was easily mastered by the men and that more trees could be treated at a smaller cost than by present methods. The 1934 experiment tested various poisons not only for their ability to destroy the mountain pine beetle broods but also as wood preservatives to protect the trees from wood-destroying insects and decay. Work was begun 1 month earlier than in 1933 because partial kill in some of the 1933 trees indicated that they were injected too late in the season, after too much blue-stain development had occurred. A total of 202 trees were treated with various dosages of mercuric chloride, zinc chloride, copper sulphate, sodium fluoride, and sodium arsenate. Complete tree data were taken for each tree to answer some of the questions which arose from the analysis of the 1933 injections. These trees will not be examined until 1935, as it has been found that mortality will not be complete until then.

Natural control of pine tip moth.--L. G. Baumhofer, Coeur d'Alene, reports that, from indications found during fall examinations, extremely high temperatures in July apparently were detrimental to several insects injurious to pine plantations in the Nebraska National Forest. Young larvae of the second generation of *Rhyacionia frustrana bushnelli* (Busck) evidently suffered a very heavy mortality, as the damage to pine leaders was much less than that caused by the first generation. Normally, with parasitization low, as was the case this year, the second generation is at least twice as destructive as the first. With the pitch moth (*Dioryctria ponderosae* Dyar) an examination of burrows under the bark showed only a 60-percent emergence, 40 percent of the insects having died during July in the mature larval and pupal stages. The normal mortality for these advanced stages is less than 10 percent, and in 1933 was only 6 percent. A record maximum temperature of 109° F. was recorded on July 15 in a weather shelter in the open; however, in stands of tall trees and in protected hollows in the sand hills temperatures from 113° to 115° in the shade were noted. Excessively high temperatures were also continuous for the unusual period of several weeks in July.

GYPSY AND BROWN-TAIL MOTH CONTROL

Scouting in barrier zone.--The scouting force was increased somewhat during the first part of November in order that work planned for the year in the Massachusetts and Connecticut portions of the gypsy moth barrier zone might be done. A total of 60 former employees were reinstated. To and including December 1, a total of 18 infestations and 961 egg clusters have been located in the Massachusetts portion of the zone and 12 infestations, totaling 5,096 egg clusters, in the Connecticut portion. The work planned for the Vermont portion of the zone has been completed and no infestation found.

Gypsy moth in Pennsylvania.--In the Pennsylvania area scouting work during November was confined chiefly to intensive work within a one-half-mile radius of assembling cages where male moths were taken last summer, and to making a rough survey of the woodland areas in the region where considerable infestation is known to exist, in order to determine the infestation conditions in the wooded sections of these towns. Only two infestations have been found in territory not previously known to be infested.

Both were discovered by checking around assembling cages where male moths were taken. No infestation has been found, however, within a one-half-mile radius of several other cages in outside territory where moths were captured last summer. Although numerous infestations have been found in the woodland areas in towns where rough scouting has been done, a large percentage of the infestations contain relatively few egg clusters scattered over a rather large area.

Gypsy moth in New Jersey.--By cooperative arrangement with the State of New Jersey a small force of State and Federal men took up scouting work during November in Morris Township, Morris County, N. J., the location where male moths were taken at cages last summer. By the end of the month 17 new and 1 old egg clusters had been found by the State force and 4 new egg clusters had been located by the Federal crew in woodland areas not far from cages where moths had been taken. The distance between the infestation located by the State force and that located by the Federal force is approximately one-half mile. Most of the egg clusters were deposited on rocks, stumps, and debris on the ground or on the lower parts of the trees. As there is considerable debris in the localities where these egg clusters were found, progress has been rather slow. On days unfit for scouting, the men burned as much of the debris as possible. A small force of Federal men are also engaged in scouting in the vicinity of an assembling cage in Pahaquarry Township, N. J., where a single male gypsy moth was taken last summer. No infestation has, as yet, been found by this crew. Pahaquarry Township borders the Delaware River and is located in Warren County, N. J., approximately 8 miles northeast of Stroudsburg, Pa.

Ropes to replace irons in shade tree work.--The men engaged in scouting and clean-up work have formerly used climbing irons in order to reach gypsy moth egg clusters deposited on trees which could not be creosoted from the ground with brushes attached to long bamboo poles. Although there has been no special criticism of the use of irons for getting into trees in woodland areas, this method of climbing shade trees along highways and in villages is rather objectionable because of the ugly-looking scars left in the trees, and also because of the possibility of spreading infection from diseased to healthy trees. It was recently decided to train our field force in the use of ropes for climbing, particularly when it is necessary to work in shade trees.

Gypsy moth control crews increased.--The gypsy moth work has been continued during the month by men in certain C. C. C. and V. C. C. camps in Vermont, Massachusetts, and Connecticut, in part of the area east of the barrier zone and west of the Connecticut River. These crews have been increased to approximately 450 men. Most of the work this fall has been confined to intensive work at the sites of infestations found last winter by C. C. C. and N. R. A. crews. The work has consisted of creosoting egg clusters, burning up fallen limbs and trees, and cutting out broken trees and those with cavities in them. Such clean-up work will result in speeding up future gypsy moth work at these places. Since the first of July, the men have examined tree growth along 88 miles of roadside and have scouted 37,757 acres of woodland and open country. They have examined over 112,000 trees growing in the open, have done chopping and burning work on 419 acres, and have destroyed over 2,000 worthless trees. In Massachusetts, 159,723 egg clusters have been creosoted; in Connecticut, 54,849; and in Vermont, 18,060, making a total of 232,632 clusters treated this fall.

PLANT DISEASE CONTROL

Barberry eradication work closed in Virginia.--G. E. Matheny brought eradication activities in Grayson County, Va., to a close on November 30. During May, June, and November, Mr. Matheny with one crew of from 10 to 18 men destroyed more than 600,000 native barberry bushes in Elk Creek Valley. Berberis canadensis, the species most commonly found in southwestern Virginia, grows in patches in pastures and along stream banks, fence rows, and the edges of timber. Few bushes are found above the timber line.

White pine blister rust survey.--During October surveys were made in 91 townships in the Northeastern States, resulting in the mapping of 46,837 acres for control work and the elimination of 16,743 acres that contained insufficient white pine for inclusion in the control areas. A total of 6,294 man-hours were spent on this work. In the West surveys have been completed on all white pine areas not previously surveyed in the Inland Empire, thus making it possible to define with a high degree of accuracy the limits of the areas on which control work should be carried on. In addition to the 778,190 acres surveyed in the Inland Empire during September and October, 251,240 acres were recently surveyed in California and a reconnaissance covering 25,280 acres was made in Oregon in October on a body of sugar pine approximately 75,000 acres in extent, the largest and finest body of sugar pine in the State.

A new method of Ribes eradication.--A chemical method has been developed as a substitute for hand-pulling or grubbing of large Ribes of the "individual bush type", this term being used to refer to Ribes growing normally in upland locations as single bushes, in contrast to large bodies of Ribes growing along streams. The chemical method consists of cutting the Ribes at or below ground level and the application of a small quantity of liquid or dry chemical to the mutilated crown. The choice of chemical is governed partly by the Ribes species to be treated and partly by soil conditions. For example, 2 to 3 fluid ounces of Diesel oil or saturated ammonium thiocyanate gives best results on R. roezli, a California species usually found on dry ground; and from 2 to 3 ounces of dry ammonium thiocyanate or sodium fluoride crystals has proved to be fully effective on R. viscosissimum, an Idaho species that grows on moister soils than does R. roezli. For the treatment of R. cereum, an average dosage of 0.3 gallon of Diesel oil is recommended. This latter Ribes is an important Oregon and California species and often grows in clumps, forming large composite crowns. The Pulaski, a cutting tool which combines the features of an axe and a mattock, appears to be the instrument most generally favored for this work, although a heavy pair of shears, somewhat similar to those used for dehorning cattle, and having an extra long handle, has proved very useful for topping bushes rooted under logs or stumps or in rock crevices. Convenient containers are now being perfected for releasing measured dosages of either liquid or dry chemical.

Treatment of diseased white pine.--During the past season an E. C. W. crew of eight men has been engaged in treating diseased white pines at Acadia National Park in Maine. This park contains a large number of white pines, many of large size, located in groups or along roadways or other points where they have a high scenic value. Before control work was undertaken in the park, a number of these large trees became infected with blister rust and an attempt is now being made to save as many of them as possible. The crew working on this project found 138 trees so badly diseased that they had to be cut down, and 524 trees were treated by cutting out the diseased portions. Sixty-two stem cankers and 1,344 branch cankers were removed, the work requiring 832 man-hours of labor.

COTTON INSECT INVESTIGATIONS

Longevity of boll weevils.--G. L. Smith, J. C. Clark, and A. L. Scales, Tallulah, La., report that two female boll weevils in their longevity tests were still alive on November 1, 1934, and are now entering into their second year. One weevil was from an outdoor hibernation cage provided with leafage and twigs for shelter, in which the weevils were placed November 1, 1933. It was removed on June 21, 1934, having been 232 days without food, and was kept in the insectary throughout the summer and provided with fresh food daily. On November 1, 1934, it was again placed in an outdoor hibernation cage, where it was last seen on November 12. The temperature dropped to 26 °F. on this date and it is probable that the weevil entered the Spanish moss and cornstalks for shelter during its second winter of hibernation. The record of the other female is about the same. It was placed in an outdoor cage with cornstalk shelter on November 16, 1933, and was removed on June 18, 1934. Food was provided during the summer and it was returned to hibernation quarters on November 1, 1934. These are thought to be the longest periods for which weevils have been kept alive.

Weevils going into hibernation this fall.--Reports from several field stations indicate that the number of boll weevils present in the fields and entering hibernation this fall varies considerably in the different sections but averages less than normal for the Cotton Belt as a whole. The weevil damage to this year's crop has also varied, being heavier than usual in parts of the Delta and South Central States and less than usual in the eastern and western parts of the Belt. Seasonal and crop conditions have adversely affected the hibernating weevils in some sections and have been favorable in others.

Boll weevil population at Tallulah, La.--R. C. Gaines submits the following table which shows the numbers of weevils caught on the flight screens at Tallulah during November of the past 5 years, and the numbers found in the Spanish moss examined after frost.

Year	Weevils caught per screen	Live weevils per ton of moss
	Number	Number
1934	106.67	192
1933	139.44	365
1932	131.50	881
1931	91.79	724
1930	---	49

Efficiency of improved cotton stalk shaver.--D. A. Isler, of the Bureau of Agricultural Engineering, working in cooperation with the staff of the pink bollworm laboratory at Presidio, Tex., reports on some recent tests with the push-type shaver and windrower developed at Presidio for cutting and windrowing cotton stalks in the pink bollworm clean-up. Changes in design since last season have greatly increased the efficiency of the outfit. Based on tests in cutting 100 acres, the shaver will cover 12.5 acres in an 8-hour day, allowing time for sharpening the knives. From 4 to 6 men were required to bunch the windrowed stalks into piles for burning. At the prevailing rates for labor and gasoline the total costs for cutting and piling were approximately $1 per acre, and these costs can be further reduced if a satisfactory rake can be developed.

Pink bollworm mortality not accounted for.--L. W. Noble, Presidio, Tex., visited the El Paso Valley this month to study the cause of the mortality of pink bollworm larvae. Attention was first called by J. S. Brock, of El Paso, to an unusually large number of dead larvae found in gin-trash collections, and to a lesser number of dead larvae in open bolls in the fields. Inoculation tests were made to determine whether these worms were infected with disease organisms that could be transferred to healthy worms by the puncture method of inoculation. There was no appreciable difference between the mortality of the groups of larvae punctured with needles that had been thrust into the diseased larvae, and that of groups punctured with sterile needles. The average mortality was about 16 percent in 10 days and was probably owing to mechanical injury. Similar inoculations made with the septicemia disease, which occurred in the laboratory in 1932, resulted in 100-percent mortality in 48 hours. There was no evidence of parasitization in the larvae and the cause of their death remains undetermined.

Light traps capture leaf worm moths.--C. F. Rainwater, Florence, S. C., reports that moths of the cotton leaf worm (*Alabama argillacea* Hbn.) were collected in a light trap at Florence up to November 6, a week following the first killing frost on October 29.

Crop tolerance of arsenic in soils to be tested.--F. H. Tucker, State College, Miss., who is working in cooperation with the soil specialist of the Mississippi Experiment Station, reports good progress on the construction of "bins" for use in experiments on the toxic effect of arsenic on crops grown in different types of soils. The excavation of five plats 82 by 7 feet was completed in November. These pits will be subdivided by concrete walls 4 inches thick and 1 foot high to form 50 bins, each 3 by 6 feet. Soil of the main types used for cotton in Mississippi will be brought in and treated with varying amounts of arsenic to determine the tolerance of cotton and other crops. Approximately 200 tons of soil will be used.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

No pink bollworm found in Lower California or in Arizona.--Gin-trash inspections have been completed in the Salt River Valley of Arizona and also in the Mexicali area of Lower California, Mexico. No indications of the pink bollworm were found in either of these areas. This completes gin-trash inspection for the 1934 season, with the possible exception of a small amount which may be examined in the Thurberia weevil area. Field inspections have been performed in the Midland area of Texas in an effort to locate the source of the specimens found in gin trash last month. Every suspected field was given a careful inspection, but no indications of infestation were found and, as only four specimens were found in gin trash, the infestation must be exceedingly light. Inspections at the San Antonio laboratory were begun during the month and have gone forward satisfactorily, with negative results.

Pink bollworm clean-up delayed in Texas.--In the Big Bend area of Texas the farmers expected to make a top crop, therefore many of them did not want their fields cleaned until a killing frost had caused the remaining bolls to open. This naturally limited the acreage available for cleaning and held up the work somewhat. It is of importance to note, however, that practically all of the most heavily infested fields were cleaned before frost and before many of the worms had gone into the ground for hibernation. At the end of the month, stalks had been cut on 1,201 acres, 762 acres had been hand-picked, and material on 727 acres had been burned, which completed the clean-up. This is approximately 200 acres more than had been cleaned at this time last year. The farmers are now making the final picking and within a short time all of the fields will be available. The number of laborers can be increased, and the clean-up should go forward rapidly from now on.

Wild cotton eradication in Florida.--The eradication of wild cotton in southern Florida has been resumed. Most of the work done thus far has been along the west coast and on several of the mainland keys. All preliminary arrangements had been completed for beginning work on Cape Sable the first of December. During the month 269¼ acres were recleaned, from which 56 mature, 150,546 seedling, and 663 sprout plants were removed. The small number of sprout plants found at this time and the small number of seedlings, in proportion to the number originally present, indicates that considerable progress is being made, and the fact that only 56 mature plants previously missed were found at this time, shows that the work is being very satisfactorily done. A number of locations previously cleaned were found to be entirely free of cotton at this time. Poison was applied to stumps of some of the larger plants last year to determine whether it was possible to eradicate the wild cotton by this means. Results were excellent, as only a small proportion of the stumps poisoned have put out sprouts. Quite a few rattlesnakes are being encountered and killed, some of the crews having killed as many as 5 in 1 day. Fortunately none of the men have ever been bitten.

Two pink bollworms intercepted from Big Bend of Texas.--On two occasions during the month material intercepted at the Marfa, Tex., road station was found to be infested with the pink bollworm. Both of these interceptions consisted of a small quantity of seed cotton found on trucks hauling cottonseed from the Big Bend to the Marfa Oil Mill. The first interception, made on November 1, contained 1 living and 2 dead larvae, and the other, made on November 10, contained 29 living and 16 dead larvae. After this last interception, steps were taken to see that the trucks were freed of seed cotton before they loaded seed at the gins. The cooperation of the truck drivers and the ginners was requested and has evidently been given, as no similar interceptions have since been made.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Pin worm damages field-grown tomatoes in southern California.--R. E. Campbell and J. C. Elmore, of the Alhambra, Calif., laboratory, report extensive damage in 1934 to tomatoes in southern California, particularly in Ventura, Los Angeles, Orange, and San Diego Counties, where approximately 7,000 acres of tomatoes were planted for canning purposes and approximately 6,000 acres for table use and shipping. Recent examinations of fruit in typical fields of Orange and San Diego Counties reveal that an average of 15 percent of the green and 50 percent of the ripe fruit were infested with the pin worm (Gnorimoschema lycopersicella Busck) in the summer growing areas, subject to general frost during the winter, whereas an average of 60 percent of the green and 100 percent of the ripe fruit were found infested on the so-called frostless areas where tomatoes are grown in the winter as well as during the summer. Actual losses were difficult to estimate, as much of the slightly damaged fruit was used on local markets and for canning. Two or three entire fields in Orange and San Diego Counties were abandoned after unsuccessful attempts to market the fruit.. Actual crop losses were further augmented by an increase of 15 to 20 percent in the cost of culling and picking. One grower was able to pack only 40 bushels out of a total of 700 bushels harvested from the field.

Indirect control of tomato pin worm.--R. E. Campbell and J. C. Elmore, Alhambra, report that field observations during 1934 have indicated that the following indirect control measures may be effective in combating the tomato pin worm: (1) The destruction of tomato plants from old, infested fields; (2) the destruction of infested fruit; and (3) the destruction of the vines and waste fruit in old tomato fields, particularly in frostless areas.

Derris gives good control of cabbage worms on collards.--W. A. Thomas and L. B. Reed, of the Chadbourn, N. C., laboratory, report that in recent tests with insecticides against the three more common species of cabbage worms on collards, a derris-dust mixture containing 0.5 percent rotenone gave the most promising results. Undiluted calcium arsenate gave almost as good results as derris, but was not as effective against the common cabbage worm. Pyrethrum dust mixtures containing 0.05 percent pyrethrin I and paris green, diluted with 9 parts of lime, gave rather varied results, depending on the time of application and the species concerned. In some of the tests, pyrethrum at the above-mentioned strength gave slightly better results than did the derris-dust mixtures. In general, the afternoon applications of pyrethrum gave better results than did the morning applications, whereas with paris green morning applications gave better results than those made in the afternoon. The three species of cabbage worms concerned were the imported cabbage worm (Ascia rapae L.), the cabbage looper (Autographa brassicae Riley), and the diamond-back moth (Plutella maculipennis Curt.).

Mexican bean beetle hibernation in Southwest.--J. R. Douglass, of the Estancia, N. Mex., laboratory, reports that the investigations on the hibernation of Epilachna corrupta Muls. in the Estancia Valley of New Mexico in 1934 confirmed the results obtained in previous seasons, to the effect that the successful hibernation of this insect is confined to the western yellow pine (Pinus ponderosa) association of the transitional life zone, especially where oak trees are associated.

Insecticidal control of lima bean pod borer in California increases yields.--Rodney Cecil, of the Ventura, Calif., laboratory, reports than an analysis of the results obtained from insecticides tested against Etiella zinckinella Treit. in 1934 revealed that applications of undiluted sodium fluoaluminate increased the yield of lima beans approximately 72 percent as compared with adjacent untreated plots. The reason for the increase in yield of treated plots in comparison with check plots is probably attributable to the protection afforded by the insecticide, as it is known from field observations that the entrance of newly hatched pod borer larvae into small pods causes such pods to drop. Substantial increases in yield were also obtained by the application of barium fluosilicate.

High mortality of pea weevil in Austrian winter field peas.--A. O. Larson, of the Corvallis, Oreg., laboratory, reports that recent examinations of Austrian winter field peas grown in 1934 have shown a high natural mortality of Bruchus pisorum L. Nearly half the weevils contained in 61 200-pea samples of unfumigated, uncleaned peas brought into five different Oregon warehouses after the period when all living weevils had had a chance to develop, were found dead. A total of 1,503 living weevils and 1,397 dead ones were found in these samples, indicating a natural mortality of approximately 48 percent.

Cigarette beetle preferences in smokes.--A. W. Morrill, Jr., of the Richmond, Va., laboratory, reports that in recent laboratory tests of the relative attractiveness of various manufactured cigarettes to larvae of Lasioderma serricorne Fab., it was shown that the "de-nicotinized" cigarettes were less attractive to the cigarette beetle than were the various brands of medicated and ordinary cigarettes. Apparently in the de-nicotinized cigarettes most of the oils and acids have been removed from the tobacco and possibly the absence of these substances renders such cigarettes less attractive to the beetle. No significant differences in attractiveness to the cigarette beetle were noted between certain widely advertised brands of medicated cigarettes and commercial cigarettes. Incidentally, it was noted that cigarettes wrapped and sealed in transparent protective coverings are not insect proof so far as this beetle is concerned.

Tobacco fumigation results in decreased losses in exports.--W. D. Reed, of the Richmond, Va., laboratory, reports that, according to recent advices from tobacco dealers, they have suffered no loss from insect infestation in flue-cured tobacco shipped to England during the first 11 months of 1934. In 1931 and 1932 the loss from arbitration over American-grown tobacco exported to England containing living insects exceeded $75,000 each year. This loss was reduced to approximately $60,000 in 1933, and in 1934 there have been no losses from this cause. This great reduction in loss may be attributed principally to the fact that practically all tobacco exported has been subjected to a well-planned fumigation program, in accordance with Departmental recommendations.

Soil composition affects wireworm population.--E. W. Jones and K. E. Gibson, of the Walla Walla, Wash., laboratory, report that detailed studies during the past several years indicate that the mechanical composition of soils in the Walla Walla and Yakima Valleys have a pronounced effect on the abundance of certain species of wireworms. These studies indicate that Limonius canus Lec. is found in from moderate to high numbers in silt loam and very fine sandy loam soils, in moderate numbers in sandy loams and fine sandy loams, but that the population of this species is very low in silty clay loam. Limonius californicus Mann. is found in moderate to high numbers in fine and very fine sandy loam soil. The mechanical analyses of the soils under observation show conclusively that a soil with a high clay content contained comparatively few wireworms and that sandy or silty soils provide a more favorable environment for them.

Mites increase rapidly on bulbs in storage.--C. F. Doucette, Sumner, Wash., in his studies of the bulb scale mite (Tarsonemus approximatus narcissi Ewing) states that the mite population of narcissus bulbs increases much more rapidly in bulbs in storage than in bulbs left in the ground during the summer. This is evidenced in a stock of Chinese lily being grown at the laboratory greenhouse. Most of this stock was allowed to remain in the ground; a few bulbs, however, were dug early in August and kept in open storage until November 1, when they were potted. Severe injury has developed in the potted bulbs but not in those left in the ground.

More on the Mexican mealybug.--H, H. Richardson, of the greenhouse-insects laboratory, Washington, D. C., continuing his studies on Phenacoccus gossypii T. & Ckll., states that both the eggs and active stages of the Mexican mealybug are much more susceptible to calcium cyanide than are those of the citrus mealybug (Pseudococcus citri Risso).

INSECTS AFFECTING MAN AND ANIMALS

Screw worm educational campaign shows results in Georgia.--As the week beginning November 8 was the closing week for most of the work, a status was obtained on the reduction of mortality percentages in areas where educational meetings were held. These figures show that the mortality, as represented by 50 counties, was reduced from 19.4 on September 15 to 12.4 on November 8, notwithstanding an increase in the average number of cases of 1,178 per county on September 15 to 2,852 per county on November 8. During the 6-week program, 18 supervisors held 792 meetings and demonstrations, with a total attendance of 23,041. Each supervisor spent approximately a week in each infested county. The costs averaged approximately $20 per week per man for mileage and subsistence.

Screw worm conferences.--On November 10, at the call of this Bureau, a conference on the screw worm situation in Georgia was held in Atlanta. About 20 representatives of the various Federal and State agencies particularly interested in this important problem were present. F. C. Bishopp served as Chairman. One of the most important results of the conference was the adoption of a series of simple recommendations for the control of the pest, these being based on the research and control experience of this Bureau. The endorsement of a single set of recommendations by all agencies will undoubtedly aid in getting farmers to adopt the most effective methods of combating the pest. Means of furthering the educational program of the Department, of checking the sale to farmers of ineffective remedies, and of reducing the danger of forest burning were discussed at length. There is a serious problem in protecting woods and forests from fires set by stock owners in their belief that the burning over of pasture areas will control the Gulf coast tick, which is an important factor in inducing screw worm attack on all classes of livestock. It was the consensus of opinion that burning would accomplish little good and might cause great destruction of young trees and wild life. On invitation, W. E. Dove, Charleston, S. C., addressed the county agents of Florida at their annual meeting in Gainesville on the subject of screw worms.

Screw worm status in Florida.--To obtain data on the results of education in screw worm control, W. V. King, Orlando, Fla., sent a questionnaire to each supervisor of the educational campaign in the State, asking for information on the present screw worm status and for an estimate of the percentage of cases due to different causes. A preliminary summary of 11 of the replies gives the following percentages in cattle and hogs.

Cause	Cattle	Hogs
	Percent	Percent
Marking	13.5	20.0
Branding	5.2	--
Castration	12.8	32.3
Dehorning	9.7	--
Attack of ear ticks	24.4	10.0
Navel infestation in new born animals	22.3	6.8
Other infestation in new born animals	3.6	6.4
Accidental injuries	5.9	16.6
Other causes	3.0	7.9

The replies indicated that the November status of screw worm infestation ranged from only a "slight improvement" to a "90 percent reduction." The reductions were attributed to the combined effect of cooler weather and better care of cases. Several reports have been received of the development of new cases following the first heavy frost (with a minimum temperature of about 30° or 31° F.). Two additional counties, Osceola and Lake, reported scattered cases during the month, bringing the total number of infested counties to 57.

Screw worm control in Mississippi.--All of the county supervisors were released at the end of the week ending November 1. One of these supervisors and one clerk were left in charge of the office work at Hattiesburg and the four division supervisors remained to follow up the work with the county agents to the week ending November 29. These men also took soil temperatures during the period and in the southern counties made a general survey of the Gulf coast tick. Very few ticks were found in any of the counties during the month. A considerable number of screw worm cases were found the first half of the month, but few or none were reported during the last week of the work.

Blowfly parasite work.--A. W. Lindquist, of the Uvalde, Tex., laboratory, has continued in charge of the blowfly parasite work at the laboratory, and 16,081 Alysia ridibunda Say emerged during the month, 12,855 being released in the vicinity of Uvalde. This makes a total of 22,075 of these parasites released during October and November. Emergence of Psilodora spp. was 1,880, and 110 specimens were released. Apparently a good stock of each parasite was in hibernation at the end of November. Mormoniella vitripennis (Walker) has bred quite freely at the laboratory during the fall and it is quite possible that this parasite will be found of considerable value in fly control.

Sand fly to be studied in Bahamas.--During the latter part of the month (November) J. B. Hull, of the Savannah, Ga., laboratory, went to the Bahama Islands for an investigation of the sand fly problem at Nassau. Arrangements were made through official channels and funds were furnished for his expenses by the American residents of Nassau.

FOREIGN PLANT QUARANTINES

Recent entomological interceptions of interest.--Eighty living larvae of the Mexican fruit fly (Anastrepha ludens Loew) were intercepted last June at Del Rio, Tex., in 16 mango fruits in baggage from Mexico. Twelve living larvae of the Mediterranean fruit fly (Ceratitis capitata Wied.) were intercepted last August at New York in two pears in baggage from Italy. This fruit fly was also taken at San Pedro, Calif., in longan (Litchi chinensis) fruits in ship's quarters from Hawaii. A living adult of Physorrhinus frontalis Cand. arrived at Mobile, Ala., on a banana fruit in cargo from Honduras. This wireworm is not recorded from the continental United States. A living specimen of the earwig Anisolabis stali Dohrn was found at Seattle, Wash., in a lily bulb in cargo from Japan. A living specimen of Sciocoris longifrons Barb. was taken at Washington, D. C., on an orchid plant in the express from Mexico. An orchid, Dendrobium taurinum, arriving last June at Honolulu, Hawaii, in cargo from the Philippines, was infested with an adult of the curculionid Tadius erirhinoides Pascoe. A living adult of Micrelus ericae Gyll. (Ceutorhynchus ericae Gyll.) was intercepted at Baltimore on dried heather in the mail from Scotland. Living larvae of this weevil were also taken at Philadelphia on dried heather in the mail from the same country. A living larva of the pyralid Pionea forficalis L. was found at New York on a cabbage leaf in stores from Belgium. Living specimens of the termite Cryptotermes piceatus Snyder were intercepted at San Francisco with bamboo packing around a shipment of candles in the mail from Hawaii. A living adult of the wireworm Aeolus yucatanus Champ. was taken at Philadelphia with banana debris in cargo from Mexico. A living adult of the anthribid Eugonus subcylindricus Fab. was found last June at New Orleans in a hardwood log in cargo from Mexico. Living larvae and adults of Scolytus scolytus Fab. were intercepted last October at Norfolk, Va., in elm logs in cargo from France. Adults of Bruchidius halodendri (Gebler) were taken at Philadelphia in seed pods of licorice (Glycyrrhiza glabra) in cargo from Greece. This bruchid is not recorded from the United States.

Recent pathological interceptions of interest.--Bacterium savastanoi EFS was intercepted at Philadelphia on an olive branch from Italy. B. vesicatorium Doidge was intercepted at New York on two shipments of tomatoes from Cuba. A bacterial leaf spot was intercepted at New York on primrose leaves from France. Stevenson's Manual and Department Bulletin 1366 fail to list such a disease. Cladosporium fulvum Cke. and Oospora lactis parasitica F. J. Pritchard and W. S. Porte were intercepted November 20 at Mobile on tomatoes from Argentina for the first time. Our first interception of Erysiphe cichoracearum DC was made at Boston on November 19, the host being chrysanthemums from England. Godronia cassandrae Peck was found in a sample of lingon berries taken by New York inspectors from a shipment from Newfoundland on November 16, and Leptosphaeria sacchari Van Breda de Haan was intercepted at New York on November 20 on sugarcane leaves from Cuba. The two previous interceptions of this disease were made in 1920 from Spanish Honduras and in 1921 from the Philippines. What appeared to be a Phoma sp.

with minute spores was found on a small diseased spot on a papaya fruit from Brazil intercepted at New York. Puccinia chrysanthemi Roze was found November 9 at New York on chrysanthemums from Germany. The only previous interception of this rust was from Mexico. A Sclerotium sp. producing numerous sclerotia resembling those of S. rolfsii Sacc. was intercepted at Detroit in a shipment of taro from China. The presence of Tranzschelia pruni-spinosae (Pers.) Dietl. on leaves in a basket of string beans enabled us to determine them as Prunus sp. The material was from France and taken at New York. Our first interception of Uromyces glycyrrhizae (Rabh.) P. Magn. was made November 19 at Philadelphia on licorice leaves from Greece. Large weathered scabs of Venturia inaequalis (Cke.) Aderh. were found on the fruit of Sorbus sp. on November 21 at New York in baggage from Italy, our first interception of the disease on this host. Nematode interceptions included Anguillulina dipsaci (Kühn) Gerv. and v. Ben. on potatoes from France at Mobile, from Germany at Mobile and New York, and from Finland at Philadelphia; A. pratensis (de Man) Goffart (2), Aphelenchoides parietinus Bastian and Heterodera marioni (Cornu) Goodey on lily-of-the-valley at New York; our first interception of Aphelenchus avenae Bastian from Peru, in potatoes at New York; and Acrobeles n. sp. in tuberose from Mexico at Nogales on October 26.

Another disease on Cuban lima beans.--Several interceptions of diseased lima beans were made at New York during November in shipments from Cuba. In addition to Elsinoe phaseoli Jenk., Colletotrichum lindemuthianum (Sacc. and Magn.) Briosi and Cav., and Fusarium sp., which have been intercepted on numerous occasions in previous years, a few lesions of Cercospora sp. and Colletotrichum sp. and a number of lesions of a Vermicularia were found. The latter appears to be the same species reported as occurring in Georgia, North Carolina, and Virginia and determined as V. polytricha Cke. (see Plant Disease Reporter 15: 113-114, Sept. 1, 1931). The specimens fit the description of Colletotrichum caulicolum Heald and Wolf on Kentucky Wonder beans as given in a plant-disease survey in the vicinity of San Antonio, Tex. (see U. S. D. A., B. P. I. Bul. 226: 35-36), and may be identical with that species. Further study is needed to clear up the relationship of these and other diseases reported on beans.

New pest of lily bulbs.--A new species of Aphelenchoides was found heavily infesting a diseased lily bulb in a shipment en route from Japan to Chicago and was intercepted at Vancouver, B. C. According to G. Steiner, of the Bureau of Plant Industry, the species more closely resembles certain forms found in connection with wood-boring insects than it does forms usually found in plants similar to lilies. The females are equipped to lay relatively large numbers of eggs. Associated with the Aphelenchoides n. sp. is a species of Diplogaster that also appears to be new.

Potato weevil larvae taken.--Living larvae of the potato weevil (Epicaerus cognatus Sharp) were intercepted in September and October 1934 in tubers of potato (Solanum tuberosum) in baggage from Mexico at Brownsville, Eagle Pass, Hidalgo, and Laredo, Tex. The first positive interception record of this insect was on May 11, 1923, at New Orleans, La., in potatoes from Vera Cruz, Mexico. The larvae render potato tubers unfit for human consumption. Because of the serious injury by this weevil, the Mexican Government has promulgated an interior quarantine placing certain restrictions on the movement of potatoes from infested municipalities in the States of Tlaxcala, Puebla, and Vera Cruz, to uninfested territory.

New nematode appears.--Recently a 2-ounce mail shipment of Eugenia seed arrived under permit at the Washington, D. C., inspection house from the experimental gardens of the Canal Zone. Examination of injured seeds in the package revealed the presence of live threadworms curled up in the dead tissue. After a study of the eelworm specimens Dr. Steiner reports them to be apparently a new species of the nematode genus Hexamermis, a group of insect parasites. One insect larva, apparently not diseased, was found in the seeds and returned for determination. Whether this species represents a host or whether some other insect is involved is not certain.

DOMESTIC PLANT QUARANTINES

Transit inspection.--The first instance of an air shipment of rooted plants moving in violation of a Federal domestic plant quarantine to come to the attention of this Bureau was recently reported by a California State inspector at Los Angeles. It consisted of 100 rooted gardenia cuttings shipped from a point in New Jersey without a Japanese beetle certificate attached. The incident is of special interest for the reason that air shipments of plant material consist chiefly of cut flowers. During the period from October 16 to June 14, however, no certification of cut flowers or portions of plants without roots and free from soil is required under the Japanese beetle quarantine.

Citrus canker.--In Texas the field agent was able to obtain the destruction on November 26 and 27 of the five trees in Galveston and Brazoria Counties on which citrus canker had been found in the fall inspections. These infections had been called to the attention of the two owners who agreed to allow eradication if evidence of infection continued. Inspections were also made of trees in the Smith Point area in Chambers County and of areas in Hidalgo and Cameron Counties, where the disease had been known to occur in previous years. No citrus canker was found in these three counties this season. In all five counties, 532,676 trees were inspected in November. In Louisiana inspections were made during the first half of November on all properties on which trees were growing in Ascension, Beauregard, Jefferson, and St. Charles Parishes. The work covered 14,683 trees in groves and 24,048 in nurseries. No evidence of infection was found.

Phony peach projects to be consolidated.--The prevention of spread of the phony peach disease, and the closely coordinated project dealing with the eradication of this disease, have for some years been carried as two distinct projects with headquarters at Atlanta, Ga., and Fort Valley, Ga., respectively. Since both projects are now under the direction of the Division of Domestic Plant Quarantines, it has been arranged, in the interest of economy and efficiency, to consolidate them on January 1, with headquarters at the Peach Disease Laboratory, Fort Valley, Ga. William F. Turner will be in charge.

CONTROL INVESTIGATIONS

Why cabbage worm is not poisoned by eating pyrethrum.--M. C. Swingle, Takoma Park, Md., has already shown that pyrethrum is not toxic when eaten by the imported cabbage worm, but is very toxic when applied to the external surface of the body. To find out whether the toxicity of pyrethrum is destroyed in the alimentary tract, worms were allowed to feed on sandwiches containing a known quantity of pyrethrum powder. Similar sandwiches were set aside as checks. The excrement of the larvae that had fed on pyrethrum was collected, dried, and pulverized. The check sandwiches were also dried and pulverized. Fresh larvae were then dusted with these two samples of powder. The check samples killed all larvae within an hour, whereas the sample that had passed through the alimentary tract was not toxic, demonstrating that these pyrethrins had been decomposed in the gut of the cabbage worm.

Nicotine bibliography nears completion.--N. E. McIndoo, Takoma Park, has accumulated 4,230 abstracts on tobacco and nicotine during this year. The classification of these abstracts preparatory to publication is now under way.

BEE CULTURE

Bee venom apitherapy.--Jas. I. Hambleton, Somerset, Md., reports that the Bee Culture Laboratory at Somerset, Md., has been receiving an unusual number of requests from doctors for information relative to the use of bee venom for the treatment of certain types of rheumatism. The successful use of bee venom for the treatment of rheumatism has been reported from time to time in foreign medical and biological journals, and advertisements in foreign medical journals are now appearing for bee venom put up in the form of salve or for direct injections with a hypodermic needle. In this connection it will be of interest to American doctors and apicultural workers to learn that a book by an American doctor, Bodog F. Beck, entitled, Bee Venom Apitherapy, is announced by D. Appleton-Century Company and will be available in January.

Recently imported "long-tongued" bees prove disappointing.--The Caucasian bee is known as a long-tongued bee, representative strains having an average tongue length longer than that of the Italian. The yellow coloration typical of the Italian is missing. In contrast to the Italian, the Caucasian is marked by bands of gray hairs on the tergites. W. J. Nolan reports that the Bee Culture Laboratory at Somerset, Md., and Herman Rauchfuss of Colorado, came into possession this summer of two queens from Russia, supposedly of the strain of Caucasian bees with the longest tongues recorded. However, the progeny showed some yellow coloration, while average tongue lengths of samples of workers reared from these queens proved no longer than those of a long-tongued strain of some other races. This shortness of tongue is not to be ascribed to any geographical change, because progeny of a similar shipment a few years ago had tongue lengths typical of the strain in question. The disappointing results of last summer's importation are to be ascribed to the great difficulty in keeping races and strains of bees pure under natural apiary conditions.

Tahiti bees affected by Nosema-disease.--Several importations of adult honeybees from the Island of Tahiti recently examined at the Somerset laboratory by C. E. Burnside were all found to be heavily infected by Nosema. The variation in the morphology of the spores was somewhat greater than is usual in the cases of *Nosema apis* from this country which have been examined at the laboratory. When the Nosema spores were mixed with sugar syrup and fed to bees in cages, practically all these bees were attacked by Nosema-disease. The length of life of affected bees appeared to be considerably shortened. The diseased bees lived less than half as long as other bees that were kept under similar conditions except that they were not given spores. In this country Nosema-disease sometimes causes a heavy mortality among bees in the winter and early spring, but in the summer and autumn the disease generally subsides, so that considerable searching is usually necessary to find a single infected bee. Although the climate in Tahiti is always mild, more than half of the bees in all the samples received from that island were found infected by the protozoan parasite. The death rate during transit was always high and in most of the cages all the bees were dead on arrival.

Colony population and production.--C. L. Farrar, of the Intermountain States Bee Culture Field Laboratory, Laramie, Wyo., reports that a high positive coefficient of correlation (0.8556), representing 135 records, was again obtained between the colony population and the production for a third season's data, 1934, when the intensity of the honey flow was standardized. The production factors per thousand bees determined from the slope of the regression equation for colony populations of 15, 30, 45, 60, 75, and 100 thousand bees per colony were 1, 1.22, 1.29, 1.33, 1.35, and 1.38, respectively. These factors show a similar trend to those obtained from three previous groups of colonies producing in 1932 and 1933, and indicated a marked advantage in having colonies strong for maximum honey production per unit of bees. During this season (1934) several colonies were developed beyond the normal maximum population of 60,000 bees by maintaining two queens with active broodnest for a 6-week period. Twelve records were obtained over this maximum, ranging from 65 to 98 thousand bees, and their production records fell very close to the standard regression lines. Variations in the regression lines for the seasonal segments indicate a greater advantage in maximum strength colonies during periods of low production, or light honey flows, than during high production, or intense honey flows.

Oregon beekeepers ask the adoption of honey grades and U. S. standards.--F. E. Todd, of the Pacific States Bee-Culture Field Laboratory, Davis, Calif., reports that, at a recent convention of the Oregon State Beekeepers' Association held at Portland on November 9 and 10, the beekeepers asked the State Department of Agriculture to take the necessary steps to enforce the marketing of the 1935 honey crop in accordance with recently enacted legislation which gave the State Department of Agriculture authority to enforce regulations dealing with honey-container sizes and with the grading of honey. The beekeepers desire that the grades on honey promulgated by the U. S. Department of Agriculture be used on the one hand and the standards proposed by the Division of Simplified Practice of the Bureau of Standards be applied with respect to containers. Mr. Todd reports that undoubtedly this action can be traced more or less directly to the results of the survey carried on by the Davis laboratory in conjunction with the Giannini Foundation of the University of California. Results of the survey are reported in Bulletin 554, entitled, Honey Marketing in California.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

A new chrysomelid for the National collection.--Recently, H. S. Barber has identified as (?) Anisostena bicolor Smith specimens received for identification from Donald A. Wilber, Manhattan, Kans., which were reared from leaves of gama grass. This species has not been represented previously in the collection at the National Museum.

Another Serica found in Maryland.--During the week of November 12, A. G. Boving identified as Serica similis Lewis about 25 specimens of a scarabaeid larva collected at Beltsville, Md., on chestnut trees brought in from Long Island.

Specialist studies weevils in Philadelphia.--In connection with the identification of some Cuban weevils submitted by S. C. Bruner and A. R. Otero, L. L. Buchanan spent November 23 at the Philadelphia Academy of Natural Sciences, studying the Curculionidae in the Poey collection of Cuban beetles.

Specialist honored by Panama.--In recognition of his contributions to the knowledge of the tropical microlepidoptera of Panama and neighboring countries, August Busck has been elected an honorary member of the Panama Canal Natural History Society.

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NEWS LETTER

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FRUIT INSECT INVESTIGATIONS

Cold wave visits Florida.--W. W. Yothers, of the Orlando, Fla., laboratory, reports that the fourth cold wave this year came on the night of December 11. He says, "It looks as if the tangerine crop would be a 100-percent loss. The damage to oranges, I believe, will range from 10 to 25 percent but grapefruit will not be severely damaged."

Steaming fruit containers kills codling moth larvae.--At Yakima, Wash., experiments to determine the best method of destroying codling moth larvae in picking boxes and cannery lug boxes are being conducted by F. P. Dean under the direction of E. J. Newcomer. An apparatus, consisting essentially of an insulated wooden tunnel 40 feet long, with perforated steam pipes in each corner and with a conveyor in the bottom for running the boxes through the tunnel, has been constructed. The steam pipes are connected to a boiler which provides a steam pressure of 60 to 80 pounds. In most of the tunnel a uniform temperature of from 200° to 210° F. is maintained, although in the first 8 or 10 feet the temperature is lower because of the introduction of cold boxes. It has been concluded tentatively that at 200° worms in apple boxes will be practically all killed in 2 minutes; with the heavier lug boxes 3 minutes are required. At 180° probably 3 and 5 minutes will be required. The cost is very low, probably not more than $2.50 per thousand boxes.

Spraying reduces effectiveness of codling moth parasites.--An experiment was conducted by Messrs. Newcomer and Dean to determine the effect of various spray materials on the percentage of parasitization by Ascogaster carpocapsae Vier., an eastern codling moth parasite introduced into the Northwest a number of years ago. In the orchard used for the experiment approximately 45 percent of the hibernating codling moth larvae were found parasitized in the spring of 1934. Data on the percentages of parasitization during the 1934 season indicated that cryolite alone, cryolite with mineral oil, and nicotine sulphate with mineral oil, all reduced the proportion of parasitization by this species. The results are given in the following table:

Treatment	Wormy apples	Parasitized larvae
	Percent	Percent
Cryolite and mineral oil	30.1	7.3
Cryolite alone	36.4	8.6
Nicotine sulphate and mineral oil	46.2	10.6
Unsprayed	94.4	26.6

New quarters for codling moth workers in Northwest.--New quarters have been obtained at Yakima, Wash., for joint occupancy by the representatives of the Insecticide Division and the Fruit Insect Division, who are engaged in codling moth investigations in the Pacific Northwest. The members of the Fruit Insect Division, who have been occupying very unsatisfactory quarters at Yakima, are moving to the new laboratory. M. A. Yothers, who has been in charge of the sublaboratory at Wenatchee, will move to Yakima on February 1, and the Wenatchee sublaboratory will be closed. The members of the Insecticide Division, formerly stationed at Wenatchee, are now moving to Yakima. In the new set-up E. J. Newcomer will be in charge for the Fruit Insect Division and C. W. Murray for the Insecticide Division.

Dispersal habits of codling moth.--Two series of experiments in codling moth dispersal were carried on during the 1934 season in southern Indiana, one at Vincennes, by L. F. Steiner, and the other at Orleans, by D. W. Hamilton. In the Vincennes experiments nearly 1,200 newly emerged adults were marked and liberated in various parts of a large orchard in which experiments with baits were in operation in two areas approximately 1,500 feet apart, and in another corner of which a few light traps were maintained. The average distance traveled by the liberated moths ranged from 130 to 250 feet, varying with the point of liberation. The longest flight, 2,000 feet, from a baited area at one end of the orchard to a light trap at the opposite end, was made by a male. The second longest flight was 1,550 feet, from one baited area to the other, by a female. At Orleans bait traps were maintained in a 35-acre block, and light traps in a 5-1/2-acre block 10 tree rows distant from the baited trees. Marked moths were liberated in both the lighted and the baited areas, as well as in the intervening region, which was neither lighted nor baited. The moths liberated in the lighted area traveled an average distance of 74 feet, those in the baited area 218 feet, and those in the check area 368 feet. No record could be made of the moths that traveled short distances in the check area, which accounts for the higher average. The figure for the larger baited area probably represents more closely the normal movement of moths within an orchard. In this series of liberations the maximum flight was 2,079 feet, entirely within the baited area. Mr. Steiner points out that if the average of 180 feet for all moths recovered in the Vincennes experiments is an indication of the distance normally covered by codling moths, experimental plats as large as 100 trees, with normal planting distances, would not be of sufficient size to offset the effects of migration.

Orchard sanitation aids in codling moth control.--A large-scale sanitation and banding experiment was conducted at Elberfeld, Ind., by Mr. Steiner and A. J. Ackerman, of the Vincennes laboratory, in order to obtain more specific information on the degree of control that may be expected from these practices. In the spring of 1934, 20 acres, or half of a square 40-acre orchard, was thoroughly cleaned up. All rough bark was scraped from the trees and burned, underbrush and surface debris destroyed, and broken branches and split pruning stubs removed. Chemically treated bands were maintained on the trees in the cleaned area during the season. The grower applied four lead arsenate sprays during the season to the entire orchard, not enough for satisfactory control under southern Indiana conditions. The worm catch in the bands approximated from 75,000 to 80,000 in number. Fruit-infestation records showed an important reduction in infestation as a result of the treatment. For one variety this amounted to 36 percent and for the other 47 percent, although the packing shed, an important center of infestation, was located in the cleaned area.

MEXICAN FRUIT FLY CONTROL

Trapping results in southern Texas.--Eleven adult specimens of the Mexican fruit fly were taken in Cameron and Hidalgo Counties, Tex., during December, making a total of 12 flies taken on 11 premises to date this season. Five of these groves were sprayed with nicotine-molasses solution immediately following the taking of the flies. The spraying in the other infested groves was held up pending the harvesting of the fruit. The infestation per trap was slightly less than during the same period last year. Practically all species of fruit flies known to exist in the valley, including *Anastrepha serpentina* Wied., *A fraterculus* Wied., *A.* sp. Seg. 3, *A.* sp. "X", *A.* sp. "Y", *A.* n. sp., *A. pallens* Coq., and *Toxotrypana curvicauda* Gerst., were taken in the traps.

Fruit flies taken on Mexican side of Rio Grande.--The operation of traps in Matamoros resulted in the taking of six adult *Anastrepha ludens* Loew. on four premises. The inspections of importations of oranges and guavas resulted in the recovery of 102 larvae of *A. ludens* and *A. striata* Schin. One carload of Irish potatoes arriving in Matamoros from the State of Vera Cruz was found to be lightly infested with *Epicaerus cognatus* Sharp. This pest hadpreviously been reported in Irish potatoes shipped into Matamoros from the State of Puebla.

Much fruit shipped from Rio Grande Valley.--Express agents throughout the valley report the largest shipments of Christmas-gift packages of fruit since 1931. On six nights previous to Christmas, special express trains of from 10 to 16 cars were required to handle these gift packages. As a large part of this class of shipments is on orders from out-of-State residents, it is evident that prosperity is returning. The truck shipments of fruit were also heavy prior to the holidays. On December 18, 165 truck loads of fruit were checked by the road station, and on each of the 10 days preceding the holidays, more than 100 trucks of fruit were inspected at the station. Grapefruit was being canned by five plants during December. These plants utilized around 1,618 tons of unclassified and Duncan grapefruit for which there was no other market. This amounted to about 106 carloads of fruit which, but for the operation of these plants, would have had to be destroyed by burial.

DATE SCALE CONTROL

Clean-up work at Yuma, Ariz.--During the month of December clean-up work was begun in the Yuma, Ariz., district. The date palms in the city of Yuma were found generally infested in 1923 and some infestations were found in the territory adjacent to the city. The area was pretty well cleaned up by 1928, and since that time scale was found only on old infested properties, the last scale being found in December 1930. The scouting and surveys this year disclosed no infestations outside the known infested area. In the infested area there are numerous palms that were treated in the past and that may harbor leaf-base infestation. Leaf bases on these palms are being pruned and inspected. Also, there are bushy seedling jungles within the area of possible spread from the last infested palms. As it is possible that incipient infestations may exist in some of these, the plantings are being thinned and pruned to facilitate inspection. Past experience has indicated that leaf-base or jungle infestations may exist indetectable by ordinary inspection for a number of years and, with favorable conditions, develop into centers of spread.

Inspection in Coachella and Imperial Valleys.--In the Coachella Valley considerable pruning was done and some leaf-base inspection and inspection in small bushy plantings were made. Several plantings in the infested areas were given their final inspection. In the Imperial Valley inspection was largely confined to the ornamental date palms in the cities of El Centro and Holtville, which are in the area of possible spread from the last heavily infested palms found.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Federal offices hold open house at Lafayette, Ind.--C. M. Packard, Lafayette, Ind., writes: "The Federal building in which our laboratory is located was open for general public inspection from 7:30 to 9:30 p. m., on January 8 and 9, with the whole staff in attendance. For this occasion we had gotten together quite a display of insects in cases, as well as the typical grasses favored by hibernating chinch bugs. Many of the visitors have shown considerable interest in these exhibits, especially those connected with the chinch bug."

Oviparous forms of pea aphid numerous in California.--R. A. Blanchard, Sacramento, Calif., reports that the pea aphid produced more than the normal percentage of oviparous forms in the vicinity of Sacramento late in the fall and early in the winter of 1934. This species usually hibernates in the viviparous form. One female that appeared to be a normal viviparous female, was brought in for cage studies. In the cage this aphid changed to blue green in place of the normal pea green, and on being dissected was found to contain several blue-green eggs and two embryos much larger than the eggs. One of the embryos had its appendages free but the other did not. The female was located on a plant of a strain resistant to aphid attack (which may account for her death); therefore it is uncertain whether both eggs and nymphs would have been deposited normally. On February 24, 1933, a similar female was swept from alfalfa near Santa Barbara. Both females were wingless and had the body shape of viviparous females.

Corn borer conditions in 1934.--A. M. Vance, of the Toledo, Ohio, laboratory, reports that in 1934 a general decrease in infestation of the European corn borer occurred over most of the 1-generation area and in parts of the 2-generation area. The data were obtained during a survey conducted from August 15 to October 5 in 125 infested counties, including 1,580 cornfields in Michigan, Indiana, Ohio, Pennsylvania, New York, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, and New Jersey. However, definite increases in borer populations in 1934 over those of 1933 were found in Monroe and Wayne Counties in western New York, and in New Haven, Middlesex, and New London Counties in southern Connecticut. In New Jersey and western Massachusetts the infestation in 1934 was considerably higher than in 1932, when these regions were last surveyed. The heaviest infestation in the 1-generation area in 1934 was located in the New York counties bordering Lake Ontario, and in a limited area in Michigan and Ohio extending a short distance southwestward from the western end of Lake Erie. In the 2-generation area, the general borer concentration continued to appear in eastern Massachusetts, Rhode Island, southern Connecticut, and on the eastern half of Long Island, N. Y. The general decrease in borer infestation in 1934 in the Great Lakes region is attributed particularly to drought and abnormally high temperatures in May, June, and July. In regions where temperature and moisture were more favorable the borer population in 1934 showed an increase, rather than a decrease.

Stink bug is one cause of pecky rice.--Rice produced in the Gulf States, and especially in southwestern Louisiana, has long been subject to a defect that often seriously lowers its market value. This defect is known to the trade as "pecky rice", a discoloration or spotting of the grain. The causes of this condition have long been in doubt but experiments initiated jointly by the Bureau of Entomology and Plant Quarantine and the Bureau of Plant Industry during the past summer have thrown considerable light on this question. The experiments show that 51 percent of the injury resulting in pecky rice in Louisiana is due to the puncturing of the rice grains by the rice stink bug (Solubea pugnax Fab.) while feeding. The remainder of the injury is due to the action of plant-disease organisms entirely dissociated from the insect. The average degree of pecky rice observed in the plats this year was 35 percent of the grain.

JAPANESE AND ASIATIC BEETLE INVESTIGATIONS

Control of adult Japanese beetle by mechanical traps.--In December F. W. Metzger, Moorestown, N. J., reported on the relative effectiveness of traps painted green, white, and aluminum. A summary of this report follows. Forty traps of the following types were tested, with intervals of 10 feet between the traps: (A) New type, green and white; (B) new type, all aluminum; (C) old type, all aluminum; (D) old type, green and aluminum; (E) old type, green and white. In this test a total of 910,283 beetles were captured. Taking type A as a standard of 100, the coefficient of the other types as a result of the mean daily differences is as follows: B, 43.4 - .87; C, 41.1 - .87; D, 75.0 - 1.11; E, 84.4 - 1.16. It has been definitely established that traps painted green and white or green and aluminum are more effective in catching beetles than are traps painted entirely with aluminum. Aluminum-painted traps are cheaper to maintain in respect to cost of material, time required for painting, and durability of finish.

Stickers for derris.--Materials such as fish oil and flour, which are commonly used as stickers for the arsenates, have been found by preliminary tests conducted by L. D. Goodhue, Moorestown, N. J., to be inadequate for derris. Consequently, a method has been developed by which a substance can be evaluated as a sticker on plant foliage. The leaf area on a number of potted plants was measured and two groups of plants having equal areas were sprayed by an automatic machine in use at this laboratory. After drying overnight, one group of plants was washed by an apparatus designed to simulate rainfall. The derris on both the washed and unwashed areas was extracted with ether, and finally the percentage removed by washing was determined by the colorimetric method of Gross and Smith. The results on bean foliage were obtained by using a spray mixture containing 1 percent derris and 0.5 percent sticker, except in the case of agar, where 0.25 percent was used. Although agar-agar has proved to be the best sticker in a large number of laboratory experiments, practical difficulties would probably prevent its use in the field. Latex, although easy to use, is rapidly decomposed by sunlight. Blown castor oil appears to be good and is practical. A concentrated emulsion stable for months can easily be prepared with triethanolamine. It can be diluted with hard water without precipitation. The ease of manipulation, the low cost, the extreme tackiness, and the high viscosity are factors which should make such an oil as blown castor a good sticker for derris.

Parasitization of Japanese beetle grubs by Tiphia popilliavora (Korean strain).--T. R. Gardner states that host grubs parasitized this fall with the Korean strain of Tiphia popilliavora Roh. were examined in November and December for cocoon formation. From 16,276 grubs parasitized by Korean females mated with Korean males a total of 10,433 cocoons were formed, a cocoon formation of 64.1 percent. Of these, 697 were discarded because of fungus and disease. From 1,082 grubs parasitized by Japanese females mated with Korean males, a total of 848 cocoons were formed, a cocoon formation of 78.4 percent. Of these, 9 were discarded on account of fungus and disease. From 366 grubs parasitized by Korean females mated with Japanese males a total of 278 cocoons were formed, a cocoon formation of 75.9 percent. Of these 14 were discarded owing to fungus and disease. The cocoons were placed in the regular single-neck emergence vials, capped, and stored in one of the temperature-control chambers for overwintering.

JAPANESE BEETLE CONTROL

Japanese beetle control in Charlottesville, Va.--Five tons of arsenate of lead were applied between December 3 and 7 to the premises on which 60 Japanese beetles were trapped in Charlottesville last summer.

Winter campaign for eradication of Dutch elm disease started.--Announcement was made early in December of the allotment of $677,000 by the Public Works Administration for control of the Dutch elm disease. As the fiscal year's appropriation bill provided that any funds allotted for this work from other government sources should first be used to reimburse the regular account, the P. W. A. allotment was reducible by $150,000, the amount of the regular Bureau appropriation. The first eradication crews to be placed in the field under the new program began their work on December 27. The number of men engaged in scouting for dead and dying trees and eradicating confirmed or otherwise tagged trees was rapidly increased as transportation facilities and equipment became available. Trees removed during December throughout the area included 61 confirmed Graphiums, and 1,045 dead and dying elms. Confirmed elms standing at the end of the month numbered 1,320 in

New Jersey, 4 in New York, and 1 in Connecticut. At the end of the year, scouts engaged in elm-tree surveys had tagged 8,388 dead and dying elms in Connecticut, 35,179 in New Jersey, and 17,912 in New York. Of these, 201 had been removed in Connecticut, 652 in New Jersey, and 323 in New York, leaving 60,303 standing. At the end of 1934 the total Dutch elm disease infected zone in the tri-State area included 2,464 square miles. The additional 10-mile protective zone included 2,170 square miles. Of this total work area, 55 percent is in New Jersey, 34 percent in New York, and 11 percent in Connecticut.

Root sampling discloses Dutch elm disease when trunk sampling fails.--Experiences in obtaining samples of suspects for culture in connection with the locating and tagging of dead and dying elms show that root sampling may indicate the presence of infection when the trunk has become too dry for fungus development. Root sampling is resorted to when the trees are dead above the ground. It has proved to be accurate in establishing the presence of the disease in dead and dying elms. In one instance seven trees in a single group were sampled from the roots and confirmed as Graphium diseased, although samples previously taken from the trunk were too dry for satisfactory culture development.

Long Island farmers cut corn stubble close.--Observations in connection with a stubble count recently completed by the inspector supplying Federal corn borer certification on Long Island, show that many of the farmers this year cut their stubble at the ground level. This is particularly apparent where the soil is sandy and where good cultivation was carried out during the growing season. Many fields have been sown to rye after the low-cut stubble was harrowed. Not much corn is raised on the eastern end of Long Island, therefore it was with difficulty that the inspector located cornfields there for counts of infested stubble.

FOREST INSECT INVESTIGATIONS

Lumber company salvages beetle-infested trees.--J. M. Miller, of the Berkeley, Calif,,laboratory, reports that the McCloud Lumber Company is now engaged in a program of removing and utilizing insect-infested pine trees from its holdings in northern California. Infested trees are located and marked in the woods by qualified insect-control spotters. Before the bark-beetle broods can emerge, these trees are felled, cut into log lengths, and hauled by truck to the railroad, where they are transported to the company's mill at McCloud. The unused part of the tree, consisting of top and limbs, is burned in the woods. So far the company has been able to deliver logs from these selected trees to the railroad at a cost of $6.50 per thousand board feet, only $2 more than the cost of treating trees by the regular method of burning them in the woods, which involves practically total loss of the merchantable lumber. In this operation the lumber company has found a market for the blue-stain lumber, which composes a high percentage of the material cut from beetle-attacked trees. Intensive studies of the economic possibilities of this type of insect control and salvage have been planned by the Berkeley laboratory.

Bark beetle infestations increase in northern California.--Mr. Miller also reports that field work of the 1934 survey, to locate areas of bark beetle infestations in Region 5, was completed by November 15. The more important timber-producing areas in eight national forests extending from central to northeastern California were covered. Aggressive infestations of the western pine beetle prevail throughout northeastern California, being particularly virulent in areas where the beetle populations had suffered a setback from the severe low temperatures of December 1932. The effect of the high mortality, resulting from the freeze, on the course of the infestation was evident only during the season immediately following--that of 1933. Recovery of the beetle populations was evident toward the close of the 1933 season, and in 1934 the upward tendency was continued, showing marked acceleration in places. One trend exhibited by current infestations is that of extension of aggressive attacks to valuable timber stands that had not suffered severe losses until this year. Examples of this tendency are to be found in the Lassen National Forest. Infestation tendencies can now be recognized as similar to those which appeared on certain areas of the Modoc National Forest in 1924 and which have reduced the stands until they are no longer of commercial value. In contrast to these conditions in northeastern California, the pine belt of the central Sierra region contains declining infestations of low intensity. Areas conspicuous because of highly epidemic conditions in 1932 suffered minor losses in 1934.

Larva of western pine beetle undergoes four instars while feeding.--K. A. Salman, Berkeley, reports that a large number of individuals were collected at the Hackamore field laboratory in Modoc County from a series of infested trees at intervals of a few days and were placed in alcohol for further study. Last fall the material was examined to determine whether the width of the head capsule of larvae is a characteristic of the stage of development. When head-width measurements were plotted against frequency, it was found that four distinct peaks appeared in the graph of the sample, which contained over 1,200 individuals. These peaks indicate that for this species there are four instars. It was found that part of the second and all of the third and fourth instars are undergone while the larvae are feeding in the outer bark of ponderosa pine, and that the first and part of the second stadia occur during the feeding period in the phloem. It was also determined that the mean measurements of populations that had developed under abnormal conditions were noticeably smaller than those of the same stadia of a sample representing a population feeding normally. This discrepancy is believed to be due to the effects of an abnormal environment on growth, probably because of nutritional deficiencies.

Alder flea beetle decreases in northern Idaho.--H. J. Rust, of the Coeur d'Alene, Idaho, laboratory, reports a very early and abundant emergence of hibernating adults of Altica bimarginata Say in April 1934, as a result of the preceding mild winter and the unusually early warm temperatures. When emergence was complete the distribution of adults was very extensive and heavy feeding was observed on young alder, aspen, cottonwood, and willow foliage. This feeding continued well into June and constituted the most destructive part of the season's activity. The normal number of eggs were laid, but there was a heavy mortality of both eggs and larvae, resulting in a light emergence of second-generation adults.

Secondary bark beetles assume primary role in destruction of lodgepole pine.--A. L. Gibson, Coeur d'Alene, reports that mountain pine beetle attacks in the bole of lodgepole pine usually precede a "fill-in" of the top and branches by myriads of smaller bark beetles, chief of which are Pityogenes knechteli Sw., Pityophthorus burkei Blkm., and Ips oregoni Eich. So long as the mountain pine beetle infestation is increasing, there is sufficient host material provided for these secondary insects, but any sudden and decided decrease of an outbreak apparently leaves insufficient ready-made food and the secondaries invade the green timber. On the Beaverhead National Forest in Montana the mountain pine beetle epidemic dropped from 17,000,000 trees in 1932 to 900,000 in 1933. As a result of this severe decrease, many hundreds of thousands of small trees were killed by the secondary bark beetles in 1933 and early in the summer of 1934, but there was a decided decrease in the number of trees killed by these insects during the latter part of the summer. As similar outbreaks of these usually secondary insects last only a year or two, serious losses to the remaining stand on the seriously devastated areas of the Beaverhead National Forest are probably over, at least for the present.

Insecticidal control of beech scale.--C. E. Hood, of the Melrose Highlands, Mass., laboratory, has been conducting spraying experiments during the past few years for the control of the beech scale to ascertain the effects of various mixtures, not only on the scale itself but also on beech trees. As a result of his studies, Mr. Hood states that he would not recommend using miscible oil for the control of the beech scale and adds that lime-sulphur mixture, used at the rate of about 7 gallons to 93 gallons of water, is an efficient and safe remedy.

Spray deposits on foliage in dense and open stands.--S. F. Potts, Melrose Highlands, has found in connection with his spraying experiments that leaves of certain species of deciduous trees and white pine are thinner on trees growing in a dense woodland than are the leaves of the same species growing in the open. For this reason the weight of insecticide deposit on a given weight of foliage may be as much as 30 percent greater when the insecticide is applied in the dense woodland than when it is applied to trees growing in the open.

Spraying wet foliage and dry foliage.--Mr. Potts has submitted a summary giving results obtained in spraying woodland plots in September to determine whether wet foliage can be satisfactorily sprayed with lead arsenate, fish oil, and water. One plot was sprayed when the foliage was perfectly dry and the other immediately after a heavy rain, using the same mixture at the rate of 5 pounds of lead arsenate and 20 ounces of fish oil to 100 gallons of water. Very good coverage was obtained on the under surface of the leaves in the wet plot. On the upper surface the deposit was fair in distribution and quantity, though not quite as heavy as in the dry plot. It took 10 percent less spray and 10 percent less time to cover the wet plot than the dry one. In the dry plot 53 percent of the lead arsenate applied was deposited on the foliage, as compared with 55 percent in the wet plot. In the dry plot 60 percent of the original deposit remained on red oak foliage after 3.32 inches of rain, and 53.9 percent on white pine foliage after 3.84 inches of rain. In the wet plot 58.2 percent of the original deposit remained on red oak foliage after 1.28 inches of rain, and 59.8 percent on white pine foliage after 1.80 inches of rain. From previous experiments it is known that the first half inch of rain removes as much of the deposit as the next 1-1/2 inches.

Beech scale found in New York.--Infestations of the beech scale have been found in Scarsdale, Westchester County, N. Y., and immediate vicinity. The presence of the insect there was reported indirectly to the Melrose Highlands laboratory by R. P. Marshall, of the Bureau of Plant Industry. On December 11 and 12, R. C. Brown and C. L. Griswold, of the laboratory, made a rough survey in that section, examining beech trees along the principal parkways. Very light infestations were found at six localities within a radius of 6 miles from Scarsdale. This is the first time the scale has been reported as being present in New York.

GYPSY AND BROWN-TAIL MOTH CONTROL

Gypsy moth control in Pennsylvania.--When gypsy moth extermination work was first begun in Pennsylvania, there were large areas in the generally infested district so covered with tangled masses of worthless and dead trees and brush that it was almost impossible to penetrate these thickets; therefore, little control work could be done until after extensive thinning. A considerable number of acres have been cut over since the work started. After thinning it is necessary to follow up the work every year to remove new sprouts. This year the State has sponsored a gypsy moth control project in Luzerne County. Work under this project is given to unemployed, who are assigned to cutting trees and also to rough creosoting work in the more heavily infested areas. About two hundred men are engaged regularly in cutting, in removing sprouts, and in rough creosoting. Areas cut over have all but the best of the tree growth removed. Any wood of value for fuel is saved, and all the brush, slash, and debris is gathered in piles for burning. Care must be exercised in the choice of sites where these piles may be burned because the outcroppings of coal veins may be so close to the surface that they may be ignited if fires are built over them. Before any burning is undertaken the superintendents of the collieries in the districts are consulted.

C. C. C. work in New England.--Gypsy moth control work in Vermont, Massachusetts, and Connecticut was continued during the month, the numbers of men employed ranging from four hundred to nearly five hundred. Since the first of July the camp men have examined trees along 143 miles of roadside, scouted 58,512 acres, examined 151,000 trees in open country, and cleaned 481 acres of woodland, removing 2,768 worthless trees. A total of 291,465 new gypsy moth egg clusters have been creosoted, as follows: 198,942 in Massachusetts, 69,795 in Connecticut, and 22,728 in Vermont. Transportation facilities for gypsy moth work are inadequate in most camps and more men would be put on crews were transportation available.

More C. C. C. work in gypsy moth control proposed.--A proposal has been made to the United States Forest Service for a substantial increase in the Federally supervised gypsy moth work east of the barrier zone, from camps in four New England States. This plan, if put into operation, will involve the use of men in approximately 40 camps already established and in the establishment of 11 new camps. About 6,000 men would be used. In most of the camps, the work would be continuous throughout the year, and the program calls for a gradual moving eastward as the areas are cleaned up. Contacts have been made with Forest Service and State officials having charge of the emergency conservation work in New Hampshire, Vermont, Massachusetts, and Connecticut. The proposal of increase is for the fifth enrollment beginning April 1.

PLANT DISEASE CONTROL

Blister rust control in Shenandoah National Park.--The Shenandoah National Park in Virginia concluded its second successful season's work in the control of the white pine blister rust. Most of the work was along the Skyline Drive and along Lee Highway at the entrance to the drive. In 1934 *Ribes* were eradicated on over 6,900 acres of land, 579,699 wild gooseberries being destroyed by 6,371 man-days of C. C. C. labor. In addition, 83 acres were reworked where seedlings had sprung up, 25,525 bushes being removed by 82 man-days of labor. A number of white pines have already been found infected with the blister rust in the park and, now that the *Ribes* have been destroyed, it is proposed to save these trees by removing the diseased parts. In several places along Skyline Drive young white pines are beginning to restock areas in which the chestnut trees have been destroyed by chestnut blight.

Bulldozer used to eradicate Ribes in West.--Developmental work performed during the last few years on the problem of eradicating dense concentrations of *Ribes* in the stream-type sites in the Inland Empire (the Idaho panhandle and adjacent territory) have demonstrated that under some conditions *Ribes* can be removed by heavy machines at a cost as low as by hand methods or by the use of chemicals. The machine used in this work is known as a bulldozer, and consists of a Caterpillar 50 gasoline tractor equipped with a master bulldozer frame and lift, special 18-inch closed tract, and a brush rake. On the average 5.11 machine-hours per acre were used. The four-man crew that operated this machine was divided into two units, each consisting of a tractor driver and a ground pilot. The units work two shifts. The ground pilot observes the conditions immediately ahead of the machine and by hand signals indicates to the driver the set for the machine blades. The heavy *Ribes* areas are located in advance of the bulldozer crew and maps are furnished showing the areas to be worked. Obstacles, such as beaver dams, are removed from an area before work is begun, and the ground is permitted to dry before the bulldozer is put on it. This machine plows beneath the surface, uproots the plants, and gathers them in piles where they remain to dry, after which they are burned. After the *Ribes* and tangled masses of brush are removed, grass seed is sown to establish a sod. This largely prevents or retards the reestablishment of *Ribes* and other brush-plant seedlings and turns the area into a pasture type.

Blister rust aecia found late in November.--T. J. King, blister rust agent in New Hampshire, had the rare experience of finding blister rust in the aecial stage late in November. He reports that on November 23, while laying out an infection-study area in a natural pasture seeding in the town of Loudon, in Merrimack County, to determine the need of control work, he found two blisters near the base of a 10-year-old pine. These blisters were apparently as fresh and full as those found in the early spring months. On returning a few days later to photograph the blisters, he noted that one of them had lost its contents and looked very much as blisters do after their spores have been disseminated late in the spring. The other blister was still unbroken and was photographed.

COTTON INSECT INVESTIGATIONS

Soil animals in cotton fields.--Reporting on the season's work on soil animals occurring in cotton fields in eastern Texas, L. D. Christenson, College Station, Tex., says that the soil fauna was roughly divided into (1) the smaller animals, including such forms as the Acarina, Protura, Pauropoda, Symphyla, and the smaller Insecta, Araneida, Myriopoda, and terrestrial Crustacea; (2) the larger soil animals, including the larger myriopods, spiders, and insects such as white grubs, wireworms, mealybugs, and root borers. The smaller-animal populations were found to average around 50 million per acre in the top 12 inches of soil, being about half as abundant as last year. No pitting or injury of importance was noted on the older roots. A few young, tender root ends were injured. It must be concluded that in this region these smaller arthropods do not seriously affect cotton-plant development. Large numbers of Pseudosinella violenta (Fols.) did not even hinder germination of cotton seeds. In cotton fields Thysanura and Collembola attain their greatest concentrations after the crop is made. The types of organisms that might feed on cotton roots are usually confined to the upper 12 inches of soil, leaving the entire root system below free from attack. It was thought that under adverse conditions such as drought, large numbers of these smaller animals might concentrate on the roots leading from deeper soil strata and by feeding there might affect circulation. This did not prove to be so during last summer's drought. The main roots in the upper 12-inch layer were as unharmed as during the previous season, being evidently too tough or unpalatable for these forms, which are typically feeders on fungus and decaying organic matter. The extreme conditions resulted in a reduction of the surface forms of the larger soil animals and a reduction of the larger insects underground, as many were unable to move successfully through their normal environment in search of food or to avoid extremes. The white-grub population was reduced from about 30,000 larvae per acre last year to about 4,000 per acre this year. The digging showed that the drought and resultant soil hardness was partly responsible. Most of the grubs were found entrapped in cavities slightly larger than themselves, in the 8- to 12-inch layer. With few exceptions, those found were yellowish and flabby and, judging from stomach contents, had been without food for a long time. Many cavities contained the dried, shriveled remains of their former inhabitants, with no evidence of fungitic or parasitic attack, indicating that such confinement was fatal. As for injury to root systems of the cotton plant by larger soil animals, none of consequence was observed during last growing season. Besides white grubs and wireworms, larger soil arthropods were rare, only three kinds being observed during the hot, dry summer--Gryllus assimilis Fab., a species of Chilopoda, and a species of Diplopoda. Usually they were found deep in the soil, G. assimilis using the almost universal shrinkage cracks to avoid extremes of temperature.

Cotton flea hopper activity.--K. P. Ewing and R. L. McGarr discontinued their flight screens for cotton flea hopper collections at Port Lavaca, Tex., on November 28. There was very little activity of the hopper after October 12 and none were taken on the screens after November 17. The numbers of hoppers taken on 12 flight screens in 1933 and 1934 were as follows:

Year	April	May	June	July	August	Sept.	Oct.	Nov.	Total
	No.	No.	No.	No.	No.	No.	No.	No.	No.
1933-----	615	1,990	3,799	6,097	1,409	1,117	177	2	15,206
1934-----	79	2,220	5,124	3,544 1/	722	777	846	8	13,320

1/Collections were not made from July 25 to 31, owing to destruction of screens by the storm.

The small number (77) taken in April was apparently the result of the croton clean-up in Calhoun County the winter before. The reduction in hopper population was strikingly evident until heavy migration started about May 6 during a rainy, windy period. It is thought that this heavy population was due to migration from outside the clean-up area. Damage to early cotton was very severe. The tropical hurricane of July 25 apparently destroyed many hoppers and checked breeding for a time, but it also ruined the cotton. The heavy rainfall during the summer produced an abundant growth of wild host plants and by fall the hopper population had become heavy. Considering the large numbers of host plants and adults present, it is expected that the winter carry-over of eggs will be large. Nine generations were reared in the insectary during the season, starting with the first field-collected nymph on April 9 and ending with an adult on October 19.

Pink bollworm parasite in the Laguna.--C. S. Rude and S. L. Calhoun, of Tlahualilo, Durango, Mexico, report that the regulations of the Mexican Department of Agriculture requiring all cotton fields to be cleaned of stalks by November 15 were well observed by the planters. The field in which the pink bollworm parasite Exeristes roborator was released and established this summer had to be cleaned, and bolls containing parasites were collected and stored. Adults that emerged during the fall were supplied with bolls containing pink bollworms, and several thousand field-collected and laboratory-bred laggard larvae of the parasite were saved. A general interest is being shown in following up this clean-up by delayed planting and it is quite probable that cotton planting will be delayed about 2 months next season. Very little irrigation water has been received from the Nazas River for use in planting next year's crop.

Withholding late irrigation reduces pink bollworm damage.--A. J. Chapman conducted experiments at Presidio, Tex., to determine whether by withholding late irrigation it was possible to reduce the pink bollworm infestation without materially reducing the yield of cotton. Two varieties of cotton--Acala, which is largely grown in the community and is not a quick-maturing variety, and Bennett, which does mature quickly--were used. The results show that pink bollworm damage and the number of overwintering larvae were greatly reduced by withholding the late irrigations. Although the yield was also greatly reduced in both varieties in one series of experiments it was not materially reduced in the early maturing Bennett variety in the other series. The most critical point is the time of applying the last irrigation. The last water should be applied late enough to afford sufficient moisture to mature the crop, but not late enough to stimulate a second growth and late fruiting. In this year's experiments the irrigations were stopped too early and there was considerable shedding and premature opening of bolls in the plots given no late irrigations. There would probably have been considerable increase in yield with very little increase in infestation had the last irrigation been applied about August 10.

Boll weevil control in Mississippi.--Results of last season's tests for boll weevil control at State College, Canton, and Hattiesburg, Miss., have been received from H. C. Young, State College. The climatic conditions were such that the boll weevils were held in check and never became very numerous. The cotton crop matured early at all three places. The dusting experiments were planned to determine the value of early and late control under Mississippi conditions. Early, or presquare, dusting with calcium arsenate alone did not control the weevils and when followed by the regular calcium arsenate treatment after 10 percent infestation did not increase the effectiveness of the regular treatment. The regular calcium arsenate treatment, i. e. dusting after 10 percent infestation in the squares and continuing at 4 or 5 day intervals as long as needed, gave a profit of $1.66 an acre at Canton, $3.27 at State College, and $6.08 at Hattiesburg. The increased yield and the profit was rather low at all three localities, owing to the light infestation. More profitable returns ($6.98 per acre) were obtained by not dusting until late in the season and then dusting from two to three times about the time migration started. These late-season dustings gave surprisingly good results and will be further tested.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Eradication of wild cotton in southern Florida.--By the end of December recleaning had been completed in Pinellas, Hillsborough, Manatee, and Sarasota Counties, and most of the area in Charlotte County had been completed. All of these counties are along the west coast. Of the mainland keys, Upper and Lower Matecumbe and Plantation Keys have been completed, considerable progress has been made on Key Largo, and work is just getting under way on Long Key. In the above areas 1,049½ acres were recleaned, from which were removed 232 mature plants previously missed, 373,184 seedlings, and 52,700 sprout plants. In addition, in Monroe County, 25 acres were cleaned for the first time, 3,250 mature plants being removed. This area was in reality an offset of the main colony, and for some reason had been overlooked during previous clean-ups. In the first part of the month unusually low temperatures killed the leaves on many tropical plants, including wild cotton. This has made the detection of cotton plants extremely difficult. However, the disadvantage has at least been partially offset by the cold weather, which stopped the cotton from fruiting and prevented the maturing of any green bolls less than half grown. Recent reports indicate that some of the cotton plants have already begun to put out new leaves, but other plants have not and it should soon be fairly easy to distinguish the wild cotton. In connection with the clean-up, 773 bolls were inspected without finding any specimens of the pink bollworm. However, 2 bolls on Key Largo showed evidence of having been attacked by the pink bollworm.

Field clean-up in Texas nears completion.--The first heavy frost of the year occurred in the Big Bend section of Texas on November 21 and 22, which killed all of the cotton, and shortly thereafter the farmers were able to begin the final picking of the top crop. This made practically all of the fields available, and as a result field clean-up went forward very rapidly. During December stalks were cut on 2,565 acres, with hand-picking and burning of the material being completed on 2,778 acres. Of this amount, 110 acres were in Brewster County, completing the work there. When the Brewster County fields were cleaned last season innumerable squares and small bolls, which had been shed because of the pink bollworm, were on the ground. As the damage was very light this season, there was practically no shedding, and this acreage was cleaned much more rapidly than had been expected. There are approximately 1,000 acres to be cleaned in Presidio County. It is estimated that this can be completed within the next 10 days or 2 weeks. From time to time during the course of field clean-up, the inspectors have been examining bolls taken at random from stalks and also some from the ground. They all report that the number of live worms found is considerably less this year than during the 2 previous years while field cleaning was in progress.

Pink bollworm inspection.--On December 31, one interception of material made at the Marfa, Tex., road station was found to be infested with the pink bollworm. This interception, from a truck en route from the Big Bend to Marfa, consisted of 16 locks of seed cotton, and 2 dead pink bollworm larvae were found. During the month, 1,070 cars were inspected and only 3 interceptions made. Throughout the present season there has been a considerable decrease in the number of interceptions made at the station, as compared with past seasons. This is due mainly to the reduction of the infestation in the Big Bend and also to the fact that the inspectors have endeavored to educate travelers to the necessity of thoroughly cleaning their cars or trucks before leaving the area. Another reason is that the Mexican cotton pickers who go to other sections to pick each season have learned that they cannot bring out pillows, mattresses, and other articles made from seed cotton. As the field clean-up is nearing completion, it will soon be possible to discontinue the road station.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Conference on arsenical substitutes.--From January 3 to 12, inclusive, a conference was held in Washington, D. C., for the purpose of completing plans for the projects to be conducted in the South this year on arsenical substitutes, and for the coordination of the general program. Attending this conference were C. F. Stahl, Sanford, Fla.; W. D. Reed, Richmond, Va.; W. A. Thomas, and L. B. Reed, Chadbourn, N. C.; K. L. Cockerham, Biloxi, Miss.; C. E. Smith, Baton Rouge, La.; J. U. Gilmore, Clarksville, Tenn.; W. J. Reid, Jr., Charleston, S. C.; and H. C. Mason, Columbus, Ohio.

Damage by tomato pin worm in southern California.--J. C. Elmore and R. E. Campbell, of the Alhambra, Calif., laboratory, report that the actual loss in San Diego County of infested tomatoes discarded because of infestation by *Gnorimoschema lycopersicella* Busck is estimated by the county agricultural officials as ranging from $100,000 to $200,000 annually, or from 20 to 40 percent of the entire crop. Orange County has a proportionate loss, while Ventura and Los Angeles Counties will average slightly less. Tomato packers report that, owing to the extra care required in packing and in culling infested tomatoes, packing costs this year exceeded those of previous years by approximately 5 cents per box. To this cost should be added the cost of attempted control, which approximated $35,000 in San Diego County, together with an additional cost to the county of approximately $15,000 for extra inspection during the packing period. In 1934 extra shipping and market inspectors were required to remove infested fruit and to watch out for harmful residues on the marketed product.

Nightshade clean-up aids in control of pepper weevil.--Mr. Elmore also reports final results obtained in the clean-up of nightshade, the principal wild host plant of Anthonomus eugenii Cano, as an aid in the control of that pest. A cooperative demonstration was conducted by county and Federal agricultural workers, with the aid of interested pepper growers. In this demonstration the nightshade was destroyed in an area of 10 square miles, and a similar area of 10 square miles, where the nightshade was not destroyed, was used as a check. In the area cleaned up the loss was 25 percent, whereas in the untreated area it averaged about 75 percent.

California may expect an outbreak of the lima bean pod borer.--Rodney Cecil, of the Ventura, Calif., laboratory, reports that continuous rains from October 1 to the end of December have favored the growth of several species of lupine that function as host plants of the lima bean pod borer. The abundance of these wild host plants affords favorable conditions for the development of a large brood of the borer that may be expected to infest lima beans next season.

Pea weevil infestation varies widely in Idaho and Washington.--T. A. Brindley, Moscow, Idaho, reports that data obtained by the Bureau of Agricultural Economics in cooperation with the University of Idaho show a great variation in the degree of maximum infestation of the pea weevil in different fields in the Palouse district of western Idaho and eastern Washington. In 20 localities in western Idaho the infestation in different fields ranged from 2.6 to 55.6 percent. In 35 localities in eastern Washington it ranged from 0.6 to 33.3 percent. These figures were based on approximately 1,600 records of infestation.

Fall weather in southern Arizona favored heavy population of beet leafhopper.--Van E. Romney, of the Phoenix, Ariz., sublaboratory, reports that fall weather conditions over the southern Arizona breeding area were favorable to the late summer and fall host plants of the beet leafhopper and caused the germination of good stands of the winter host plants. As a result, leafhopper populations appear to be rather high over the entire breeding area. Should precipitation be sufficient to maintain the host plants until next May, heavy migrations of the beet leafhopper may be expected from these breeding grounds into the beet-growing districts of western Colorado and eastern Utah.

Derris effective against harlequin bug, tests indicate.--L. W. Brannon, of the Norfolk, Va., laboratory, reports that in field-cage toxicity tests an average kill of 95 percent of the harlequin bug was obtained by using a derris-root dust containing 0.75 percent rotenone, with talc as a diluent. Slightly better results were obtained with derris-root dusts than with the derris sprays. Of the sprays used, the best results were obtained with derris-root powder in water at the rate of 1.5 pounds (containing 5 percent rotenone) in 50 gallons of water, using 1 pound of high-grade powdered soap as a wetting agent and sticker.

Harmful residues on cabbage may be avoided.--W. J. Reid, Jr., and C. O. Bare have summarized the general results obtained at the Charleston, S. C., laboratory during the 2 years of residue tests on cabbage as follows: (1) On cabbage marketed as U. S. Grade No. 1, ordinarily bearing four outer loose leaves, insecticides producing arsenical residues should not be applied within a period of 40 days prior to harvest nor after the plant begins to form a head. (2) On cabbage marketed as U. S. Grade No. 1 (green), ordinarily marketed as an entire plant with not more than 7 loose outer leaves, arsenical insecticides should not be used at any time. (3) In general, none of the insecticides harmful to man should be applied to any part of the plant that is to be used as food. (4) The amount of rainfall during the growth of the plants evidently influenced the quantity of residue that remained on the plants at harvest, but apparently did not greatly affect the duration of the period before harvest that the insecticides could be applied safely without exceeding the legal tolerance. Substantially the same results were obtained in a similar series of tests by C. E. Smith at the Baton Rouge, La., laboratory.

Cultural methods control sand wireworm.--J. N. Tenhet, Fairfax, S. C., reports that unsatisfactory results were obtained in all attempts to control the sand wireworm by direct methods. However, control was achieved by the proper application of cultural methods, including resting of the land, attention to favorable planting dates, avoidance of attracting the egg-laying female beetles, increasing the soil fertility with humus, and crop rotation.

Strawberry tarsonemid mite synonymous with cyclamen mite.--F. F. Smith, of the greenhouse-insects laboratory, Washington, D. C. found as a result of interhost transfer with living cultures of the strawberry tarsonemid mite (Tarsonemus fragariae Zimm.), received from California, that T. fragariae responded in the same manner as did T. pallidus. This was also confirmed by experiments conducted by Leslie M. Smith, of the California Agricultural Experiment Station. As a result of extensive examination by Mr. Smith and H. E. Ewing, of the National Museum, of preserved specimens from California and England, it was concluded that T. pallidus and T. fragariae are alike morphologically and are apparently similar biologically.

Hot-water treatment controls iris thrips.--In preliminary tests for the control of the iris thrips, Mr. Smith found that by placing an iron cylinder (ash-can with bottom removed) over the plant, thrusting the edges into the soil far enough to hold the water around the plant, the hot-water treatment can be applied to infested clumps without digging or otherwise disturbing the plants, thereby avoiding a temporary setback and the loss of 1 year's crop of flowers, which would result if the plants were lifted for treatment. After the soil was warmed with water at 120° F., the cylinder was filled with water at 114° until the foliage was covered. The cooling effect of the plant and exposure to the air lowered the temperature to 111°, and by adding more water at 114°, this temperature was maintained for the 30-minute period required to kill the thrips. All thrips on such treated plants were killed. The plants were uninjured by the treatment and were going into winter dormancy satisfactorily.

Factors affecting degree of infestation by narcissus bulb fly.--Ralph Schopp, of the Sumner, Wash., laboratory, in determining the effect of the type of soil and the depth of planting (4, 6, and 8 inches) on the degree of infestation by the narcissus bulb fly, found that there is evidently a greater survival of larvae in peat soil than in silt and that survival is greatest at a depth of 6 inches.

Fumigation with methyl formate-carbon dioxide gas effective against two tobacco pests.--W. D. Reed, Richmond, Va., reports that in recent tests with methyl formate-carbon dioxide gas against the cigarette beetle and the tobacco moth in vacuum chambers, it was found that at 78° F. a dosage of 25 pounds per 1,000 cubic feet, with an exposure of 3½ hours, or a dosage of 15 pounds per 1,000 cubic feet, with an exposure of 17 hours, was effective. When the tobacco was exposed to a temperature of 62°, a dosage of 30 pounds of the fumigant per 1,000 cubic feet, with an exposure of 3½ hours, or a dosage of 20 pounds per 1,000 cubic feet, with an exposure of 17 hours, was required.

INSECTS AFFECTING MAN AND ANIMALS

Effectiveness of treatment recommended for screw worm.--That the campaign for educating farmers and stock raisers of the Southeastern States in the proper methods of treating screw worm cases was badly needed, is borne out by the following excerpt from the report of D. C. Parman, who had charge of the work in Mississippi: "The work was favorably received by the people and was a conclusive demonstration of the prophylactic value of the recommended measures and the nontoxic effect of the treatments. Most of the people thought that any serious case of worms would kill an animal, and when the work was begun many animals were being left to die or were being shot. A good demonstration was made at one place where one cow had been shot and another was about to be. I insisted that the cow could be saved in a few minutes with a few cents' worth of medicine. In less than 10 minutes the wound was cleaned and dressed, using approximately 2 ounces of each medicine (benzol and refined pine-tar oil). Although the cow appeared to be too weak to walk when the treatment was begun, almost as soon as it was finished she took on new life and began to feed. She was completely healed in 2 weeks, with only three more light applications of pine-tar oil."

Continuation of F. E. R. A. screw worm project in Georgia.--In Georgia the educational campaign for screw worm control has been extended so as to permit promotional work in construction of stock pens and chutes on the open range for the purpose of treating screw worm cases. An additional allotment of $5,000 for a period of 16 weeks from the F. E. R. A. makes possible the employment of 4 or 5 men for this work. Projects are to be started in the different counties having open ranges, with labor and some of the materials to be furnished by the county F. E. R. A. organizations. The State veterinarian and the Bureau of Animal Industry are cooperating in supplying pens needed for testing cattle. The same pens can be used for both screw worm and tuberculosis work.

Ectoparasites of deer in Pisgah National Forest.--H. S. Peters, Takoma Park, Md., spent a week early in December in examining deer killed by hunters in the Pisgah National Forest, N. C. This was during a special hunting season arranged by the Forest Service in an effort to reduce the number of deer in this forest. The work was done in cooperation with L. C. Morley, of the Bureau of Biological Survey, and W. M. Rush, of the Forest Service. Fifty carcasses of Virginia white-tailed deer were examined. They were found to be in excellent condition, showing only a very light infestation of Mallophaga and, in two cases, of Anoplura. The Mallophaga were mostly Tricholipeurus virginianus Peters with a few T. parallelus Osborn. The Anoplura were determined as Cervophthirius crassicornis Nitzsch. No ticks, hippoboscids, or mites were found and practically no internal parasites or disease of any kind.

Sand fly breeding at Nassau, Bahama Islands.--At the request of Americans residing at Nassau in the British Bahamas, and with travel funds provided by them, J. B. Hull, of the Fort Pierce, Fla., sublaboratory, spent about 10 days in the Bahamas studying the sand fly situation on New Providence and Hog Islands From examinations of the swamps and with tests for salinity and for sand fly larvae, he was able to locate the breeding places of sand flies and to designate the more important places. On account of the coral formation and the prevailing opinion that salt seepages occur on these islands, Mr. Hull suggests that diking and pumping be considered as an experimental step for the Bahamas. Measurements of water depths in lakes showed no rise or fall of the water level during a period of 10 hours, and Mr. Hull thinks there is little or no seepage.

FOREIGN PARASITE INTRODUCTION

Introduction of tachinid parasite of elm leaf beetle.--On December 20 the Melrose Highlands, Mass., field laboratory received a shipment of 5,500 elm leaf beetles from H. L. Parker, Hyeres, France. A note accompanying the material stated that dissections of a sample lot of these beetles showed that 20 percent contained the maggot of the tachinid fly Anachaetopsis nitidula Vill. The beetles are being kept under conditions considered satisfactory for hibernation, and it is hoped that a sufficient number of adults of the tachinid will issue next spring for satisfactory colonies. The tachinid was liberated by the laboratory for the first time in 1934, being obtained from material received from France.

FOREIGN PLANT QUARANTINES

Recent entomological interceptions of interest.--Thirty-eight living larvae of the Mediterranean fruit fly were intercepted at San Francisco in a single avocado fruit in baggage from Hawaii. Nine living larvae of the Mediterranean fruit fly were taken at New York in an apple in stores from Greece. Fourteen living larvae of the papaya fruit fly arrived at New Orleans in a papaya fruit in stores from Panama. Living specimens of Uleiota australis Er. were intercepted at Norfolk, Va., in walnut logs in cargo from Australia. The insects were found between the bark and the sapwood. A living adult of Parmenonta valida Thom. was taken at Mobile, Ala., on banana debris in cargo from Honduras. A living adult of Sinoxylon conigerum Gerst. was found at New York in a wooden case in cargo from India. Living specimens of *Cicadella sirena* Stal, *Exitianus picatus* Gibson, and *Collaria oleosa* Dist. were collected on yam foliage in the field in Puerto Rico, the first at Isabela, and the remaining two at Mayaguez. *Targionia hartii* Ckll. was taken last April at Philadelphia on ginger in stores from Africa. *Silvanus vulgaris* Grouv. arrived at Boston with banana debris in cargo from Honduras. A living larva of the European corn borer was intercepted at New York in a tomato in stores from Italy. An orchid, *Dendrobium spectabile*, arriving at San Francisco in cargo from Borneo was infested with a pupa of *Baris orchivora* Blackb. This weevil is usually known incorrectly as *Acythopeus orchivorus* Blackb. Living larvae of the Mexican bean beetle were intercepted at El Paso, Tex., with spinach leaves in cargo from Mexico.

Recent pathological interceptions of interest.--*Bacterium maculicola* (McC.) was intercepted at New York on turnip leaves from Germany. The only previous interception of the disease on turnip was from England. Our first interception of *Cercospora destructiva* Rav. was made at Seattle on November 25 on *Euonymus japonica variegata* from Japan. *Colletotrichum nigrum* E. and H. was intercepted from France for the first time on December 8 on peppers at New York. A good specimen of *Gibellula arachnophila* (P. ex Ditm.) Vuillemin completely covering a small spider was received from San Juan, P. R. *Gloeosporium* sp. (unlike species reported on related plants) was intercepted at Washington on *Agapetes seligera* and *A. speciosa* from England. The first interception of *Glomerella cingulata vaccinii* Shear on *Vaccinium* was made December 1 at New York in a large shipment of frozen blueberries from Newfoundland. Our first interceptions of *Mycosphaerella brassicicola* (Fr.) Lindau were made at New York on cauliflower from Germany on November 28, November 30, and December 17 and from Belgium on December 10. *Scirrhia bambusae* Turconi was intercepted at Washington on bamboo supports for plants from Italy. This is our first interception of the disease which Stevenson's manual lists as occurring in Italy only. Our first interception of *Septoria chrysanthemella* Sacc. was made at Seattle on November 25, followed on November 30 by an interception at New York. The Seattle interception was on chrysanthemums from Japan while the New York material was from Germany. *Vermicularia* sp. (spores too small for *V. ophiopogonis* Pat.) was found at Washington on leaves of *Ophiopogon japonicus* from Istanbul, Turkey. *Iris alberti* infected with *Didymosphaeria* sp. was found at Washington, D. C., on October 30 in a shipment from Union of Soviet Socialist Republics. It differs from *D. minuta* Niessl. in its longer spores; *D. palustris* (B. & Br.) Sacc., the other species reported on iris, lacks measurements in the published descriptions. *Leptosphaeria circinans* (Fckl.) Sacc., a fungus said to cause root rot in alfalfa and several other hosts, was collected at Washington, D. C., on December 3 on *Medicago* sp. from Turkey. This fungus is not listed by Seymour as being present in North America. *Ascochyta heterophragmia* Passer. was found on December 5 on a few tea leaves (*Camellia japonica*) which passed through the inspection house at Washington, D. C. The plants were shipped from Nantes, France. There is no record of this fungus occurring in the United States. *Phyllosticta rabiei* (Pass.) Trott. was found on December 6 on *Cicer zangoneium* as a pod spot. The infected material originated in Union of Soviet Socialist Republics. Nematode interceptions included *Acrobeles* n. sp. in tuberose bulbs from Mexico intercepted on October 26 at Nogales; *Anguillulina dipsaci* (Kuhn) Gerv. and v. Ben in carrot from England at New Orleans, in potato from Belgium on November 28 at

Philadelphia, and from Russia at Boston, in lily-of-the-valley from Germany at New York (6); Anguillulina pratensis (de Man) Goffert in lily-of-the-valley from Germany at New York (3); Aphelenchoides parietinus Bastian in carrot from Denmark at Philadelphia, in ginger root from China at Boston, in lily-of-the-valley from Germany at New York (6), and taro from Japan at New York; Aphelenchus avenae Bastian in lily-of-the-valley from Germany and in potatoes from Bermuda, both at New York; and Heterodera marioni (Cornu) Goodey in lily-of-the-valley from Germany at New York (4) and in potato from Japan at New York.

New nematode on elm.--A sterile fungus apparently of secondary importance was collected on November 17 in the bark of an elm burl from France offered for entry at Baltimore and sent to Washington for possible determination. Microscopic examination revealed the presence of numerous nemas and eggs. These were determined by Dr. Steiner as Anguillulina n. sp. It is said that this species is close to A. major Fuchs, an associate of the European bark beetle (Ips typographus L.).

Fruit fly in passengers' baggage.--From a special report on the inspection of baggage of passengers arriving on the S. S. Saturnia at New York on November 1, 1934, the following items are taken as illustrating the constant danger to which this country is being subjected through plants, fruits, and vegetables carried by tourists. This ship carried 1,150 passengers, including 200 first class, 350 tourist, and 600 third-class. Of the 22 sacks of fruits and vegetables found in their effects, 85 percent were taken from the third-class group, nearly all of this intercepted material being found in suitcases and trunks where the fly could pupate among the clothing and other articles and thereby be distributed far away from the port. Some of the fruit collected was examined for Mediterranean fruit fly, with the following findings: 6 live larvae from 2 oranges out of a lot of 25 from the Azores; 22 live larvae from 4 small sorbe fruits out of 5 pounds from the Azores; 20 larvae from 3 sorbe fruits out of 200 from Portugal, 100 percent infested; 1 live larva from an Italian orange in a lot of 35, apparently 25 percent infested. The remaining fruit in the 22 sacks was burned without further examination, as facilities are not available for safeguarding such a mass of material during the period of examination. The material included: Apples and quinces from the Azores; persimmons from Portugal; peaches, sweet limes, pomegranates, pricklypears, grapes, pears, apples, quinces, and green olives from Italy; persimmons and pomegranates from Greece; and pomegranates from Syria. It is estimated that if all this fruit had been examined it would have been found to harbor between 1,000 and 5,000 live larvae of the Mediterranean fruit fly.

Bulbous growth in coconut.--A bulbous growth obtained from a coconut and somewhat resembling a fungus gall was submitted by an inspector at Brownsville, Tex., in December. This growth, not often encountered in commercial coconuts, as it is not formed until a year or more after the nuts reach maturity, consists of the swelling base of the germinating embryo, the enlargement taking place at the expense of the absorbed meaty tissue. It is understood that on the west coast of Mexico this growth is eaten fresh and is regarded as a delicacy. It is also sold in the dried state on the markets as "coconut apples."

Citrus black fly intercepted at Philadelphia.--From an orange branch found in possession of a passenger from the Bahama Islands who was stopped on the dock at Philadelphia on November 28, specimens of the citrus blackfly were taken, as well as the citrus whitefly, three known species of scale, two other scale insects as yet unidentified, an unidentified thrips, some insect egg masses, and a fungous disease on the leaves.

Stem borer in carnation.--In a shipment of 12 rooted carnations entering from England and examined at the Washington inspection house on December 21, there were found 11 larvae of a species of Hylemyia. This insect, which is related to the onion, cabbage, and seed-corn maggots, occurs in Europe and has been reported from British Columbia, Canada, and is difficult to detect on account of its habit of boring within the carnation stem.

DOMESTIC PLANT QUARANTINES

Checking Christmas-tree movements.--An unusually large number of shipments of Christmas trees and Christmas greens, moving as apparent infringements of the gypsy moth quarantine, were intercepted in transit during the season just closed. There were approximately 148 such infringements as compared with 45 in 1933. The car-lot movement of such trees was well under way early in December and during that month transit inspectors at Philadelphia, New York, Chicago, Cleveland, and Washington checked approximately 700 such car lots moving from New England points. The freight shipments, however, were found to be properly certified, the violations consisting of mail and express packages, nearly all of which were intercepted at Boston and New York. At the latter point, owing to better facilities for handling parcel post, the efficiency of inspection, especially during the Christmas rush, was greatly improved.

Transit inspection established at new points.--Transit inspection will be initiated the middle of January at Atlanta, Ga., the Bureau inspector to be assisted by a Georgia State nursery inspector. Temporary inspection will be instituted at Memphis, Tenn., and St. Louis, Mo., in January, and this work will be resumed at Kansas City early in February. The force at New York has been increased by the temporary assignment of a Bureau man employed on phony peach disease inspections at other periods of the year. Seasonal inspection is being made at Detroit, Mich., Cleveland, Ohio, and Indianapolis, Ind., by temporary assignment of inspectors from corn borer activities.

Citrus canker eradication in Texas.--Headquarters for Federal inspectors on citrus canker eradication in Texas have been transferred from Austin to Houston. An additional Federal inspector has recently been assigned to the work, and this force will shortly be supplemented by at least one more inspector. The cooperative force of four to five State inspectors, also working on eradication of this disease, will be supplemented by other State inspectors as available. During the month of December, 31,097 trees in 8 counties were inspected. No additional infections were found. The removal of all varieties of citrus trees susceptible to the canker has been accomplished on one of the two properties in the Galveston area where the disease has been known to exist for some time, the owners not having consented to the destruction of the infected trees until the latter part of November. The absence of susceptible species, it is believed, will tend to reduce the likelihood of recurring infection and of the eventual spread to the satsumas in the nearby orchard.

Citrus canker inspection in Louisiana.--All properties where trees are known to be grown in Ascension, Beauregard, Jefferson, and St. Charles Parishes were inspected in November, under cooperative arrangements with the State, and no citrus canker infection was found. The work covered 19,860 citrus trees in groves, and 37,248 in nurseries, and is a part of an intensive, complete inspection program which will include all known citrus plantings in the State.

Phony peach disease work in orchards in 1934.--The sixth seasonal campaign in the eradication of this disease from orchards was completed with the close of 1934, and the general decrease in the percentage of diseased trees over the entire period, as well as the increasing interest in the work manifested by commercial peach growers, is encouraging. A survey of orchards in Georgia the past season showed that in commercial orchards only 2.12 percent of the trees inspected showed infection of the disease as compared with 8.31 percent in home orchards inspected. A summary of the work of 1934 shows that in Georgia, Louisiana, and Texas, of the 4,650,420 trees inspected in commercial orchards, 98,621 were infected with the disease; and that of 68,116 trees inspected in home orchards, 3,062 were infected.

Phony peach disease control in nurseries.--During the season of 1934, Bureau inspectors, at the request of State officers concerned, cooperated in inspecting for the phony peach disease around 143 peach-growing nurseries in Alabama, Arkansas, Georgia, Illinois, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, and Texas. The inspections, which covered a radius of a mile around each nursery, resulted in the finding of 373 infected peach trees, which affected the status of nurseries containing 1,113,507 exposed trees; 2,878,913 trees were not found to be exposed to infection. Quarantines of most of the infected States provide that peach stock be accepted for shipment or sale either (1) if the environs of the nursery to the extent of 1 mile are free from the phony peach disease, or (2) if the peach nursery stock is inspected tree by tree at digging time or before shipment, and all trees infested by the peach borer are culled out and destroyed.

CONTROL INVESTIGATIONS

Dormant period of imported cabbage worm broken in greenhouse.--In November cabbage worms being reared by M. C. Swingle in a greenhouse at Beltsville, Md., failed to emerge as butterflies in the usual period. After a dormant period of about a month in the pupal stage at temperatures between

70° and 30° F. butterflies emerged, and the usual life cycle at these temperatures was resumed in December.

Pyrethrin content of alcoholic extracts of pyrethrum and their toxicity to house flies.--F. L. Campbell and W. N. Sullivan, Takoma Park, have begun a project in cooperation with the Food and Drug Administration to find out what chemical method of analysis for pyrethrins in alcoholic extracts give results best representing their insecticidal effect on house flies. Results so far obtained indicate that the problem is not a simple one.

Fall armyworm and corn ear worm being reared for laboratory tests of insecticides.--Material provided by W. H. Larrimer, Arlington, Va., is being reared with some success by J. W. Bulger at Takoma Park. At present the fall armyworm seems the more promising of the two species for winter work.

BEE CULTURE

Beekeepers' Congress.--Warren Whitcomb, Jr., and E. Oertel, of the Southern States Bee Culture Laboratory, and Jas. I Hambleton, Somerset, Md., attended a Beekeepers' Congress held at Valdosta, Ga., on December 17-20. This congress was participated in by several national organizations, including the American Honey Producers' League, the American Honey Institute, the Southern Beekeepers' Conference, and the Control Committee of the marketing agreement for package bees and queens. This was probably the largest meeting of beekeepers ever assembled in this country. Beekeeping leaders from 31 States were present, as well as a large delegation from Canada. The editors of all but one of the bee journals were in attendance, and practically all the large beekeeping supply houses were represented. The president of the American Honey Producers' League appointed a legislative committee for the purpose of giving aid to the States in legislative matters, particularly those affecting bee inspection and marketing and grading of honey. This committee was also instructed to sponsor apicultural work of the Bureau. A very strong feeling was evident at the meeting that the work of the Southern States Bee Culture Field Laboratory should be extended to include intensive research on problems relating to the shipping of package bees and queens. Purchasers of queenbees, in particular, have been complaining bitterly over the early losses of queens that have been sent through the mails. Several resolutions were adopted at the meeting, commending the work of the Bureau of Entomology and Plant Quarantine.

Beekeeping Short Course.--On January 8 and 9, W. J. Nolan, Somerset, was one of the speakers at the Beekeeping Short Course given by the Ontario Agricultural College at Guelph, under the direction of Dr. E. J. Dyce, Professor of Apiculture and Provincial Apiarist. Mr. Nolan discussed the symptoms of bee-brood diseases, the symptoms of adult bee diseases, the care of extracted honey from hive to container, and chemical and physical factors governing the secretion of nectar. The course lasted 10 days and about 100 people were in attendance. Some of those taking the course had had no experience with bees, while one operated 700 colonies. Great interest was manifest. Short courses were being given in other branches of agriculture at the same time, and the enrollment in these, too, was reported to be unusually large.

Meeting of Maryland Agricultural Association.--C. E. Burnside, Somerset, attended the annual meeting of the Maryland Agricultural Association, at Baltimore, on January 9 and addressed the Maryland Beekeepers' Association on the subject of plant poisoning of bees and brood. It is not definitely known that this type of poisoning is serious in Maryland; however, G. E. Abrams, Maryland State apiary inspector, reports having observed symptoms resembling those of plant poisoning of brood. Samples resembling brood killed by plant poisoning have also been received by the Bee Culture Laboratory from Maryland beekeepers. Those in attendance showed considerable interest in the subject and volunteered to report suspicious cases to the laboratory. The meeting was well attended and all sections of the State were represented.

California bees suffer from spray poison.--F. E. Todd, Davis, Calif., reports that the application of insecticides to California's fruit, vegetable, and field crops appears to be threatening the bee industry in several sections of the State. The chief damage reported was from dusting melons and peas in the Imperial Valley, tomatoes in the Sacramento Valley, and citrus and vegetables in other parts of the State. The use of airplanes for application has made the situation acute. The losses suffered by beekeepers during the past season have run into many thousands of dollars, not only in reducing the beekeepers' prospective crops but also by destroying their capital investment in producing units. At the State Beekeepers' Association Convention held at Santa Ana, it was evident that the industry in many sections feels that this problem must be solved or the industry will go out of existence. The solution of the problem appears to have three possibilities: (1) The beekeepers feel that means should be provided for notifying them when insecticides are to be applied so that they can protect their property. Cooperation with the State Department of Agriculture and the agricultural commissioners on this phase of the problem was tentatively arranged at the Santa Ana convention. (2) The rights of the beekeepers, the commercial insecticide appliers, and the growers have not been clearly defined in California courts. It appears likely that sooner or later these rights will have to be defined by court action. (3) There is pressing need for research to develop insecticides less harmful to bees, for effective repellents and means of protecting colonies during spraying, and for procedure which will aid the recovery of colonies that have been sprayed. At the Pacific States Bee Culture Field Laboratory, at Davis, where airplane dusting of tomatoes caused considerable damage in 1934, trials were made on closing the hives from daybreak till noon for a period during the dusting and several days after. This method gave some promise of protecting the colonies from destruction, the basis for this procedure being that the source of damage to the hive was shown to be the pollen which was gathered largely during the morning hours. There are in California five or six local situations under which bees are damaged, each of which required special study. As far as funds will permit, studies similar to those at Davis will be made of the other situations in the State.

Honey standardization.--Mr. Todd states that, contrary to reports he has received in previous years, discussion of honey standardization is now being given a wholehearted reception by California beekeepers. Standardization of containers is now being rapidly corrected by glass manufacturers, so that the chief interest in this subject is in the matter of standardized grading. The recent meeting of the California State Beekeepers' Association went on record as favoring the placing of honey standardization on the California statutes by the next legislature. The economic studies at the Davis laboratory, which have been conducted in cooperation with the University of California and the Oregon Agricultural Experiment Station, have undoubtedly done much to bring about the changed atmosphere and have crystallized the action taken. If and when California successfully concludes this project, all honey in Washington, Oregon, California, and Nevada will be placed on the market under standardized grading.

California beekeepers move colonies without closing entrances.--Beekeepers in California, according to Mr. Todd, have found that they can move bees much more satisfactorily and with less loss if they move them with the entrances open. This practice has grown to such an extent that probably half of the migratory beekeepers in the State are now moving colonies without closing the entrances. In a few cases, particularly in the Los Angeles area, keekeepers have stopped with truck loads of bees in populated sections at service stations and like places, and the bees have caused some nuisance. In addition, there was one wreck in the San Joaquin Valley this year that attracted the attention of the Highway Department. Many of the beekeepers feel with just cause that they are liable to be barred from the highways through legislative action unless they take the initiative to correct the trouble caused by beekeepers who have exercised poor judgment in the moving of colonies. Apparently colonies can be moved open in most parts of the State without the bees becoming a nuisance, while in the heavily populated centers, as at Los Angeles, this cannot be done.

The use of package bees for strengthening colonies.--Warren Whitcomb, Jr., of the Southern States Bee Culture Field Laboratory, Baton Rouge, La., reports that, in connection with the experimental shipments of bees made last year, some tests were attempted to determine the value of adding 2 pounds of bees without queens to colonies just at the beginning of the honey flow. In these tests 20 packages were added to colonies at Hallock, Minn., at Alba, Mich., and at Sheldon, Iowa. It is unfortunate that at Hallock and at Sheldon a failure of the honey flow made the tests valueless, although at Hallock the strengthened colonies made a much better start than the check colonies before the drought stopped the flow. At Alba, in one yard of about 60 colonies, 4 packages were united to weak colonies, 4 packages to medium colonies, and 4 packages to strong colonies. In each case, colonies similar in strength and provisions were used as checks. At the end of the honey flow the weak colonies showed a gain of between 20 and 30 pounds over the checks, the medium colonies showed a gain of approximately 45 pounds over the checks, and the strong colonies showed a gain of approximately 70 pounds over the checks. Complete data have not yet been received but the preliminary tests show that there may be justification for the strengthening of colonies just at the beginning of the honey flow. Beekeepers seem to be much interested in this work and several shippers have offered to supply bees for similar tests during the coming season.

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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR JANUARY 1935

Vol. II, No. 3 (Not for publication) March 1, 1935

DOMESTIC QUARANTINE ON DUTCH ELM DISEASE

A quarantine on account of the Dutch elm disease (Notice of Quarantine No. 71) became effective February 25. Under the provisions of this quarantine certain areas in the States of New Jersey, New York, and Connecticut are designated as regulated, and movement therefrom of elm plants or parts thereof of all species of the genus Ulmus is prohibited, irrespective of whether nursery, forest, or privately grown, including (1) trees, plants, leaves, twigs, branches, bark, roots, trunks, cuttings, and scions of such plants ; (2) logs or cordwood of such plants; and (3) lumber, crates, boxes, barrels, packing cases, and other containers manufactured in whole or in part from such plants, unless the wood is entirely free from bark.

MELROSE HIGHLANDS LABORATORY TO BE CLOSED

The advent of the Dutch elm disease brings about the closing of one of the oldest and best known laboratories of the Bureau. The Melrose Highlands, Mass., laboratory will be closed sometime during the coming summer and the greater part of the personnel will be transferred to Morristown, N. J., to work on insect vectors of the Dutch elm disease. C. W. Collins will be in charge of the new laboratory at Morristown. The work pertaining strictly to forest insects and to the liberation and recovery of parasites will be continued at the Bureau's New Haven, Conn., laboratory, in cooperation with the Northeastern Forest Experiment Station. R. C. Brown will be in charge of this new set-up. The Gypsy Moth Laboratory was established by L. O. Howard early in the present century for the purpose of studying the gypsy moth and of introducing parasites from Europe. This laboratory became world famous and the results obtained here have stimulated parasite studies in several other countries. Its visitors' register carries the names of practically all of the better known entomologists in this country and of many famous Europeans.

CUSHING MADE ASSISTANT LEADER

E. C. Cushing has been appointed to the newly established position of Assistant Leader of the Division of Insects Affecting Man and Animals. Mr. Cushing reported for duty in Washington, D. C., on February 11. He is a graduate of the Texas A. & M. College and has taken postgraduate work there and also at the Liverpool School of Tropical Medicine, and at Cornell University. He has been a member of the staff of this Division since 1928.

FRUIT INSECT INVESTIGATIONS

Control of citrus rust mite with sulphur in cool weather.-- W. W. Yothers and M. R. Osburn report an interesting experiment conducted in December at Orlando, Fla., in the control of the citrus rust mite by the use of sulphur dust, ordinarily considered most effective at high temperatures. When the dust was applied the weather was cool and cloudy, the humidity was high, and the temperature was 67° F. The application of the dust was followed by comparatively low temperatures. There was a good kill of the mite immediately after the application, but little or no mortality during the following period of low temperatures.

Parasite readily finds isolated colony of citrus blackfly.--James Zetek, in charge of the laboratory at Balboa, Canal Zone, reports an interesting observation on *Eretmocerus serius* Silv., an Asiatic parasite of *Aleurocanthus woglumi* Ashby. The parasite was introduced into Cuba and the Canal Zone in 1930 and 1931. A planting of citrus trees was made at an isolated point that had recently been filled in about one mile from any other citrus. The trees were known to be free from the blackfly at the time they were planted, but soon became very heavily infested. A recent inspection showed that the parasite has already located this flourishing colony of the blackfly and is rapidly cleaning it up.

Parasitization of oriential fruit moth increases.--H. W. Allen and G. J. Haeussler, of the oriental fruit moth laboratory, Moorestown, N. J. report that *Macrocentrus ancylivorus* Roh., an important native parasite of the oriental fruit moth, has greatly increased in dominance and distribution over any previous year of record and has become, by a wide margin, the dominant parasite of twig-infesting larvae. It is now apparently established in the following counties in which liberations have been made in the past but where it had not previously been recovered: Franklin, Plymouth, and Worcester in Massachusetts; Middlesex in Connecticut; Monroe and Schuyler in New York; Beaver in Pennsylvania; Dorchester in Maryland; Rockingham in Virginia; Pickens and Spartanburg in South Carolina; Roane in Tennessee; Columbiana, Licking, and Lorain in Ohio; Marion and Massac in Illinois; and Cape Girardeau in Missouri. It has this year become the dominant parasite, showing effective parasitization in orchards in many counties outside the area of its effectiveness when colonization was started. It continues to be the most important parasite in most counties where it was found prior to the widespread liberations. This season *M. ancylivorus* was recovered from 16 States, 49 counties, 88 towns, and 125 properties, or 47 percent of all counties, 49 percent of all towns, and 48 percent of all properties, a far better distribution record than that of any other species.

New host records of oriental fruit moth parasites.--*Macrocentrus ancylivorus* was reared at Moorestown from *Ancylis comptana fragariae* Walsh and Riley infesting raspberry, and *Epiurus indigator* (Cress.) from *Macrocentrus* cocoons from the same host. *Macrocentrus delicatus* Cress. was reared from a small undetermined lepidopterous borer in a host plant believed to be *Polygonum pennsylvanicum*.

Raisin-insect infestations eliminated by processing and packing.--Charles K. Fisher, of the Fresno, Calif., laboratory, reports the results of a preliminary series of tests in which two crops of raisins were sampled before packing operations began and at several points in their progress through the processing machinery, in order to determine the effectiveness of different manufacturing steps in removing infestations of *Plodia*, *Ephestia*, and the saw-toothed grain beetle. Although from 4.8 to 16.5 percent of the original infestation remained after the stemmer had been passed, all infestation was removed by the combined effects of stemmer, grader, and recleaner. Further tests will be made in warm weather, when eggs and newly hatched larvae will be more abundant. Mr. Fisher says, "It is of interest to note that the 1934 crop of raisins contained *Ephestia* but no *Plodia*, while the reverse was true of the 1933 raisins."

Relation between drop size and oil deposit of spray emulsions.--Experiments were made by A. W. Cressman, of the Fruit Insect Division, and L. H. Dawsey, of the Insecticide Division, of the Wooster, Ohio, laboratory, to show the relation between the average drop size of the emulsions and the quantity of oil deposited on paraffine-covered mica plates. Three emulsions, prepared from petroleum oil, glue, and water, were mixed with a high-speed stirrer, the drop size being varied by changing the length of time the mixture was stirred. Counts for drop size were made from both concentrated emulsions and nozzle samples. The sprays were applied with a pressure sprayer with a modified Vermorel nozzle and operated at 50 pounds pressure. The results showed that when identical spraying conditions were maintained the oil deposit on the mica plates bore a constant ratio to the deposit on potted chrysanthemum plants. The results indicate that the average drop size was materially decreased by passage through the spray nozzle and that the amount of oil deposited on the plates increased as the drop size increased.

MEXICAN FRUIT FLY CONTROL

Trapping results along Rio Grande.--The operation of traps on the Texas side of the Rio Grande resulted in the taking of 142 adult Mexican fruit flies on 86 premises. Eight of these flies were taken in 6 brush locations somewhat removed from bearing citrus groves. In addition to the Mexican fruit flies taken, specimens of 9 other species of fruit flies were recovered in the traps. There was a decided increase over the preceding month in all species taken. Intensive inspections in the groves in which fruit flies were taken disclosed no larvae. As soon as possible after the finding of adult flies, the State-operated power sprayer was placed in the groves and the trees were sprayed with nicotine-molasses, some 14,274 trees in 31 groves being sprayed during the month. In addition to the spraying, owners of groves in which flies were taken were urged to harvest the fruit immediately, ship the salable part north of the Cotton Belt, and dispose of the remainder through the canning plants or by burial.

DATE SCALE CONTROL

Progress in scale eradication.--In January the Reed Date Garden in the Imperial Valley, a commercial planting of 538 palms, most of them Persian varieties from 10 to 20 years old, was inspected and no scale was found. This garden was infested with Parlatoria date scale at the time of planting and in all probability the scale was eradicated. The garden was reinfested later, presumably from a heavily infested planting of Canary Island palms about a mile and a half distant. One moderately infested palm was found in July 1933 and repeated inspections up to and including February 1934 have disclosed 9 lightly infested palms grouped around it. Since the last scale was found in February 1934, four careful inspections have been made, the last this month (January), and no scale has been found. Since April 1933 no scale has been found except in this garden and none in any commercial garden since September 1931. In 1931 only 4 infested palms were found in commercial gardens. Clean-up work is progressing in the Yuma district in Arizona and in the Coachella Valley. Previously infested seedling palms of no value are being dug out, and the leaf bases are being removed from others. To facilitate inspection, many previously infested plantings are being pruned.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Distribution of corn borer parasites.--D. W. Jones and W. G. Bradley, Melrose Highlands, Mass., report material progress in 1934 in the distribution of the more promising imported parasites of the European corn borer over the borer-infested territory, supplementing previous releases for this purpose. Approximately 70,000 parasites became available from European and oriental importations and domestic collections, the majority including *Lydella stabulans* var. *grisescens* R. D., *Inareolata punctoria* Roman, and *Chelonus annulipes* Wesm. The value of the two first-named species in the natural control of the borer has been definitely established. At the close of 1934 *L. stabulans* had been distributed over the greater part of the more heavily infested territory, whereas extensive releases of *I. punctoria* are still required before its distribution will be comparable to that of *L. stabulans*. The emergence of all imported parasites during 1934 is summarized in the following table. The difference between the numbers of adults released and those emerged are accounted for by shipments to Canada, mortality during distribution, and retention for biological observation.

Species	Place of origin				Total
	Italy		Japan,	United	
	Falconara	Castelnova	Miyakonojo	States	
Bracon atricornis (Smith)----	---	---	10	---	10
Chelonus annulipes-----------	12,049	2	---	---	12,051
Cremastus flavoorbitalis Cam-	---	---	354	---	354
Eulophus viridulus Thos------	---	16,050	---	---	16,050
Inareolata punctoria---------	3,311	310	---	5,317	8,938
Lydella stabulans var. grisescens (oriental)------	---	---	8,038	---	8,038
Lydella stabulans var. grisescens (European)------	35,654	2,252	---	1,222	39,128
Zenillia roseanae B. B--------	3,351	---	---	73	3,424
Total----------------	54,365	18,614	8,402	6,612	87,993

Effectiveness of Trichogramma in control of sugarcane borer.--J. W. Ingram, of the Houma, La., laboratory, reports that during 1934 H. A. Jaynes and E. K. Bynum conducted 20 experiments to determine the value of releasing Trichogramma minutum Riley as a control for the sugarcane borer. These experimental plots were laid out with the assistance of a soil specialist from the Bureau of Plant Industry, a plantation scientific man, managers, and overseers. The overseers checked the areas for past similarity of treatment and equality of past yields. Each experiment consisted of a parasite-release plot, supplemented by buffer and check plots, each averaging about 5 acres. From 11,750 to 25,930 adults of Trichogramma, furnished by Dr. Herbert Spencer of the fruit-insects laboratory at Albany, Ga., were released per acre in June, July, and the first half of August. Borer egg counts, made every 3 weeks until the middle of September, showed practically no difference in the rise in parasitization between the release and check plots, the borer infestations being practically the same at harvest time. Weights and sucrose analyses of the cane grown were obtained in 18 experiments. Six experiments showed that more sugar was produced per acre in the parasite plots; 5 experiments favored the checks; and the remaining 7 showed no difference in sugar production. The average yields of sugar per acre for the 18 experimental plots harvested were as follows: Parasite plots, 2,651 pounds; buffer plots, 2,796 pounds; and check plots, 2,729 pounds. In determining beneficial results from Trichogramma releases, none of the following factors consistently favored the releases: (1) Percentage of parasitization, (2) joint infestation, (3) sugar yield per ton of cane, and (4) tons of cane produced per acre or weight of sugar per acre. It is therefore evident from data carefully accumulated over a period of 2 years that no advantage results from Trichogramma releases for borer control.

Loss caused by sugarcane beetle in southern Louisiana.--J. W. Ingram, Houma, reports that in determining the loss to sugarcane from injury by the sugarcane beetle, 100 young plants whose growing points had been killed by the beetle and 100 uninjured plants were marked by stakes last May in fields of the varieties Co. 281 and C. P. 807. Examinations and samples of stalks taken in November gave the following results:

Variety	Original plants	Millable canes produced	Average weight each	Sugar per ton of cane	Average weight of millable cane produced per market plant
	Number	Number	Pounds	Pounds	Pounds
C. P. 807					
Noninjured plants--	89	194	1.53	194.5	3.32
Injured plants------	91	36	1.21	190.0	.48
Co. 281					
Noninjured plants--	92	255	1.43	186.7	3.72
Injured plants------	94	66	1.23	180.3	.86

Second fall generation of hessian fly overwintering at Wichita, Kans.--J. R. Horton, Wichita, reports as follows: "The mild weather during October and November started a small second fall generation of hessian fly, which is now successfully anchored in the wheat plants and promises to survive the winter. It was estimated that approximately 5 percent of the forms now in the local wheat are of this generation. Pupation began during the last week of October, when the soil temperature averaged 62° F. Soil moisture was approximately 18 percent and continued up to the week ending November 26, with soil temperature averaging 55° for the entire period and soil moisture averaging 19.5 percent. It was estimated that pupation and emergence amounted to approximately 6 percent of the puparia. Eggs resulting from this emergence were found during November on late-sown plants. An examination of more than 400 living fly forms during the week ending February 4 showed the presence of larvae of all stages, from the recently hatched, red stage to full-grown ones. The weather in December and January was mild, with afternoon temperatures ranging from 20° to 55° F. except for brief cold spells in the last 2 weeks of January, which froze the wheat almost to the ground but did not injure the fly."

Hessian fly parasite shipped to California.--L. P. Rockwood, Forest Grove, Oreg., reports that on January 9, 1,875 hessian fly puparia obtained from wheat stubble near Forest Grove in November and December and estimated to be 13 percent parasitized by Platygaster herrickii Packard, were shipped to the Bureau's laboratory at Sacramento, Calif., for attempted introduction into that State.

Early infestation of pea aphid in San Fernando Valley.--R. A. Blanchard, Sacramento, reports that of 6 alfalfa fields examined for the pea aphid in the San Fernando Valley on January 30, 4 had small populations, 1 a population nearly large enough to cause damage, and 1 a damaging population. This is the earliest date that a population large enough to cause damage has been observed in any locality in California. The damaged field had growth from 14 to 16 inches tall, the tips of which were severely damaged by what appeared to be a combination of aphids and frost. New growth from 3 to 4 inches tall had come up below the old stems and the aphids were present in large numbers on it. A considerable percentage of this new growth was being yellowed and wilted by the aphids. The fungus Entomophthora aphidis appeared to be controlling the infestation. The fungous disease had apparently prevented damage in the other heavily populated field. On January 29 careful examination of Scotch broom in Clackamas County, Oreg., failed to reveal any pea aphid eggs. The broom has been watched for several years and this is the first time aphid eggs in numbers have not been found at this time of year.

Chinch bug population in Kansas.--W. T. Emery, Wichita, Kans., reports that on January 29, 15 stubbles of kafircorn taken from a field near Manhattan, yielded 207 living chinch bugs and 1 dead one. The ground was frozen and had previously been subjected to subzero temperatures. It was too wet to sift when thawed out, but when it was warmed and dried the chinch bugs were found to be normally active.

Say's stink bug as a predator.--O. L. Barnes, Tempe, Ariz., reports that the pentatomid Chlorochroa sayi Stal. was found feeding on the eggs of the range caterpillar near Optimo, N. Mex., last November. The contents of the eggs had been sucked out by the bug, a characteristic feeding puncture being left on the egg shell. Eggs bearing similar punctures had been observed in previous collections made in New Mexico.

JAPANESE AND ASIATIC BEETLE INVESTIGATIONS

"White" disease among Japanese beetle larvae.--In January experiments were started by I. M. Hawley and S. R. Dutky, Moorestown, N. J., to determine the effect of temperature and of the size of inoculum on the time of development of the "white" disease in artificially infected third-instar grubs. Twenty healthy grubs were injected with 2,000,000 spores of the causal organism and exposed to various temperatures. The time of development at various temperatures was as follows: At 86° F., 6 days; at 77°, 9 days; at 62°, 14 days; and at 48°, the grubs were not diseased after being exposed for 28 days.

Snow cover protects Japanese beetle larvae.--In order to obtain some data on the influence of snow cover on soil temperature, report Mr. Hawley and T. N. Dobbins, the snow was removed from a plot about 15 feet square and the soil temperature at the 3-inch level was obtained with thermometers and recording thermographs. The lowest temperature in grass sod beneath the snow was 32,6° F., in bare ground covered with snow, 26°, and in bare ground with the snow removed, 15.4°. The air temperature was below zero on several nights during this period, the lowest record being -9°. From laboratory studies it is known that a temperature of 15° is fatal to all larvae of the Japanese beetle subjected to it for only a few hours. It is evident, therefore, that periods of low temperature such as experienced this year in the absence of snow will prove fatal to many larvae of the Japanese beetle, whereas with the presence of snow coverage there is little likelihood that the larvae will be affected by the low temperature.

Stickers for derris.--In the previous report on investigations being conducted by L. D. Goodhue, Moorestown, blown castor oil was shown to be a good sticker for derris. In the belief that other blown oils having similar properties should also give good results, a sample of heavy blown sardine oil was tested and found to be equal to if not better than blown castor oil. It can be obtained at about half the price of blown castor oil and possesses the advantage of a higher viscosity. When soap is used as an emulsifying agent the emulsion of this oil is very sensitive to cold hard water. It cannot be diluted without precipitation. This difficulty has been overcome by the use of casein as a dispersing agent and protective colloid. In emulsions prepared as indicated above, it will probably be necessary to use a preservative to prevent the putrefaction of the casein. Experiments employing phenol are in progress. Tests with blown castor oil show that the temperature of the water used to wash the sprayed bean leaves is an important factor. With water at 59° F. (15° C.) three determinations show 5, 5, and 10 percent removed. Two results obtained by washing at 77° F. (25° C.) show that 30 and 40 percent was removed. This is explained by the lower viscosity of the oil at the higher temperature. Since blown fish oil has a higher viscosity than blown castor oil, it gives better results when washed at the higher temperature. The order with which the spray ingredients are mixed is important in washing. Better results are obtained when the emulsion and the derris are thoroughly mixed before being added to the hard water than when the water and emulsion are mixed and the derris added last. Using the first method only 11 percent was removed from glass plates by washing, but under the second method more than 28 percent was removed.

Lampblack superior to dyes in withstanding weathering.--Mr. Goodhue also states that derris with 15 percent of the following pigments were exposed to the weather: Venetian red, prussian blue, titanium dioxide, and lampblack, using agar as a sticker. After 1 week the lampblack mixture lost only 20 percent by decomposition, while the other pigments lost from 50 to 70 percent. In this experiment lampblack was much superior to titanium dioxide.

Stickers for lead arsenate.--Experiments were carried on during the past season by A. R. Rolfs and L. Koblitsky, Moorestown, to determine the value of different materials as stickers for lead arsenate on foliage. During January 510 analyses for arsenic were made on leaf samples in connection with the tests conducted to compare the value of the spray deposits left on foliage by coated lead arsenate and by ordinary lead arsenate alone and with various stickers. A statistical analysis of the data obtained on the lead arsenate residue on the foliage immediately after spraying and at intervals during the summer shows that (1) flour, or aluminum sulphate and sodium bicarbonate do not increase the initial deposit of lead arsenate but do increase its permanency; (2) lead oleate as a coating for lead arsenate did not increase the initial deposit and decreased its permanency; (3) fish oil increased the initial deposit considerably and also increased the permanency of this deposit even more effectively than did flour or aluminum sulphate.

Control of adult Japanese beetle on field-grown roses.--In January F. W. Metzger, Moorestown, completed a report on control of the Japanese beetle on field-grown roses. Sixteen materials were tested for repellency to the Japanese beetle. Preliminary data indicate that o-chlorophenol, cresol, limpid oil, and carbasota (the last two materials being coal-tar intermediates) may be of considerable value in preventing injury in small home gardens where only a few plants are under cultivation.

Effect of cool storage on field-collected Japanese beetle parasite.--M. H. Brunson, Moorestown, reports that adult females of Tiphia popilliavora Roh. as well as other Tiphia, apparently will not withstand storage in shipping containers at low temperatures over long periods of time. Females were collected in the field and a number of them were placed in separate shipping cans containing soil, food, and water and the cans were placed in refrigeration. Another series of females were placed in breeding cans to serve as checks. It was noted that at 50° F. females were able to survive for 15 days with a mortality of only 2 out of 15 parasites. In 20 days 10 were dead, and in 25 days 11 were dead out of lots of 16 each. At 42° complete mortality occurred in 10 days.

Correction.--In the February 1, 1935, News Letter (vol. 2, no. 2), lines 9-10, p. 5, under "Control of adult Japanese beetle by mechanical traps", should read: "B, 43.4 ± .87; C, 41.1 ± .87; D, 75.0 ± 1.11; E, 84.4 ± 1.16."

JAPANESE BEETLE CONTROL

New Jersey nursery inspections reveal corn borer infestation.--Observations were made during September, October, and November 1934 for corn borer infestation in and near 54 New Jersey nurseries. About one-third of the counts were made in the northern and extreme western parts of the State. Infested stalks were found in or near 13 nurseries. Counts at these establishments varied from 1.2 to 3.2 larvae per stalk. In most instances counts were made of 100 random-selected stalks.

Increase in Christmas tree shipments from New England.--During the Christmas tree shipping season of 1934 there were certified 377 carloads of trees. In addition, 206 carloads were shipped from the 41 towns in Vermont recently released from quarantine. This total of 583 compares with a total of 459 carloads certified from the entire quarantined area in 1933. As the inspected trees all originated in the lightly infested area, only a single gypsy moth egg cluster was found.

Scattered infestations of brown-tail moth found in two Maine towns.--Observations for brown-tail moth webs by the district inspector stationed at Bangor, Maine, disclosed scattered infestations of this insect in Orono. Two small infestations were also found in Oldtown. Both of these towns are situated outside of the area regulated on account of the brown-tail moth.

Summary of chemical treatments for Japanese beetle in 1934.--During 1934 there were treated 3,264 cubic yards of potting soil in 55 nurseries. Of this total, 2,317 cubic yards were treated with carbon disulphide, 842 sterilized with steam, 77 treated with lead arsenate, and 28 fumigated with naphthalene. Over 12 percent more soil was certified in this manner than in 1933. Heeling-in areas to the extent of 614,909 square feet were given a certified status during 1934. Nursery plots with growing stock determined as eligible for certification totaled 3,798,281 square feet. The total acreage in lead arsenate treated soil, including heeling-in areas and plots of nursery stock, amounts to 101.3 acres. While beetles were in flight in the Philadelphia market district, 247 cars containing 87,001 bunches of bananas were fumigated with hydrocyanic acid gas. A total of 1,987 crates of blueberries were fumigated with carbon disulphide.

Rapid organization of Dutch elm disease eradication work.--Organization of eradication crews and their placement in the field proceeded as rapidly as available motor vehicle and other equipment permitted. During the month 75 new stake-bodied 1½-ton trucks and 4 standard sedans were delivered. Saws, axes, ropes, and other equipment for felling trees were purchased in quantities. By the end of January there were 95 P. W. A. and 25 C. C. C. eradication crews in the field. The total Federal personnel engaged in scouting for dead and dying trees, and eradicating condemned trees, numbered 1,287. Suspects confirmed as diseased since discovery of the infection in New Jersey in 1933 totaled 7,688 at the end of January. In the course of the month 720 diseased trees were removed--719 in New Jersey and 1 in Connecticut. This left 601 infected trees in New Jersey and 3 in New York. These are marked for early destruction. Scouts surveying for dead and dying elms tagged 19,288 trees in Connecticut, 43,965 in New Jersey, and 35,176 in New York. Dead and dying trees removed numbered 6,076 in Connecticut, 2,487 in New Jersey, and 13,042 in New York. Dead and dying elms standing at the end of January totaled 137,127.

Outside assistance in Connecticut Dutch elm disease eradication.--A number of helpful instances of cooperation from municipal, State, and company officials have been reported from Connecticut. The tree warden of the town of Greenwich has agreed to remove and destroy all condemned trees along streets and roads within his jurisdiction. The town has already removed a number of such trees. The gas and light company of Stamford has requested that they be allowed to top all condemned trees that are close to power lines in the towns of Stamford and Darien. The landscape division of the State Highway Department has given blanket permission to allow our organization to remove all condemned trees along State highways. State crews are pruning highway trees in New London and Middlesex Counties. They are burning all elm material taken from trees in and near the Dutch elm disease work area.

Weed destruction combined with certification treatment.--In two instances this week, soil treatments in the Washington, D. C., district, were made in excess of the requirements for certification purposes. Ten cubic yards of potting soil were treated with carbon disulphide at the rate of 1½ pounds per cubic yard. The required dosage is 1 pound per cubic yard. The period of treatment was extended from 48 hours to 2 weeks. Daily treatments of soil with steam are being made for the experimental greenhouses of the Department. The average temperature runs around 200° F. Each of the described treatments is sufficient to kill any weed seeds present in the soil and more than fulfills the certification requirement.

FOREST INSECT INVESTIGATIONS

New forest-insect laboratory established.--The Division of Forest Insects has recently established a new western laboratory with headquarters at Denver, Colo. J. A. Beal, of the Portland, Oreg., laboratory, and L. G. Baumhofer, Coeur d'Alene, Idaho, have been assigned to the new laboratory from the permanent staff. Dr. Beal will be in charge. The territory covered includes, roughly, the States of South Dakota, Nebraska, Kansas, Colorado, and Wyoming, parts of Utah and Oklahoma, and all of the proposed Shelter Belt area. Work on the Shelter Belt project will be one of the main functions of the laboratory and in connection with this set-up a temporary field station will be established in the Shelter Belt area. In addition to other work some of the forest-insect problems of Arizona and New Mexico will be handled from the Denver office. In January Messrs. Beal and Baumhofer made a trip through part of the region and then to Washington, D. C., in preparation for the establishment of the new laboratory, which, it is expected, will be functioning about March 15.

Wood borers in white pine lumber.--H. J. MacAloney, of the New Haven, Conn., laboratory, reports that the black horned pine borer (Callidium antennatum Newm.) has done considerable damage to seasoned round-edged white pine lumber in New England during the past 2 years. Particuarly, losses have resulted in stacks of resawed boards glued into squares and then piled in the mill rooms awaiting manufacture into circular pail lids. In many instances the tunnels ruin the edges of the lids and it is also not uncommon to find a tunnel paralleling the glued seam.

GYPSY AND BROWN-TAIL MOTH CONTROL

Gypsy moth infests American beech.--A gypsy moth infestation, discovered recently in one of the towns in the southwestern portion of the barrier zone, in Massachusetts, is located in a stand composed almost entirely of American beech. Nearly pure stands of this northern hardwood are not at all unusual in that section of the State. The trees in the area found infested were damaged considerably by the ice storm of January 1922, when so many shade and forest trees suffered very greatly from ice that accumulated on their branches. The beech trees of the infested stand have never recovered from the tearing and breaking they were subjected to at that time and many of them have broken and badly decayed tops, which cannot be climbed to examine them for infestation. It has been found necessary to cut off from 5 to 25 feet of the tops of such trees and lower the cut portions to the ground where they can be examined in safety. A number of gypsy moth egg clusters have been found and destroyed on these lowered tops. It has been decided to conduct a special gypsy moth survey in New York, New Jersey, and Pennsylvania outside of the area now known to be infested with this pest. Arrangements have been made with the States concerned so that either Federal or State inspectors, or both, may be assigned to special scouting in sections and localities suspected of harboring infestation. Such places as tourist camps, summer resorts, parks, hotels--particularly those frequented by transients--places of amusement, freight stations, or bus terminals--especially those more or less surrounded by trees--private grounds where considerable ornamental planting has been done, and areas where road machinery or other contractors' supplies are being used, especially if these have been moved long distances. Experienced Federal gypsy moth men have been assigned to work in towns in New York, New Jersey, and Pennsylvania, with instructions to cover as much territory as possible with thoroughness, continuing their efforts up to the time when gypsy moth eggs normally hatch. Men from the various State forces are to perform as much similar work as their other duties will permit. It is planned to have examinations made in all of the towns in New Jersey that have not been scouted previously. In Pennsylvania the Federal workers are to examine towns in an area entirely surrounding the present area of known infestation, while in the remainder of the State the State nursery inspectors are to make similar examinations in towns in their respective districts. In New York, Federal men are to work in the area in the southeastern section of the State immediately adjoining the New Jersey and Pennsylvania State lines, while the State forces are to work in towns in other sections west of the barrier zone. Arrangements have been made with the State nursery inspector of Ohio to have some of this special survey work performed in that State by the inspectors. Arrangements are also being made with the State nursery inspectors of Delaware and Maryland to have similar work performed by men working under their direction.

Labor problems in Pennsylvania.--Some difficulty was experienced in the Pennsylvania area when over a hundred men, assigned to the Works Division of the Luzerne County Emergency Relief Administration for cutting and clean-up work, struck in support of demands they had made for changes in working conditions. Mine workers, who compose the majority of the men employed on that type of gypsy moth work, have for many years been accustomed to taking short periods in the middle of the morning and afternoon for lunch. As such rest periods are not practical in gypsy moth work, they have not been granted. The men who struck demanded these rest periods, the privilege of smoking while on th work, and the privilege of warming themselves around the fires where brush and slash were being burned. Because of the fire hazard in the coal-mining sections no smoking can be permitted while the men are working. Only a few of the men were emphatic in the demands, but they induced the others to strike with them. State officials informed the men that the demands could not be granted, and nearly all returned to work.

C. C. C. work in New England.--Gypsy moth work by C. C. C. workers was continued throughout the month in 7 camps in Connecticut, 10 in Massachusetts, and 1 in Vermont. Severe weather and heavy snowfall have slowed up the work somewhat but the largest number of men were assigned to this work since the first of July and an average of about 600 men have been used. Since the first of July 289 miles of roadside trees have been examined and 100,138 acres scouted 213,719 individual trees in open country have been examined; and 561 acres of woodland have been cleaned, resulting in the removal and burning of over 3,000 worthless trees. A total of 330,154 gypsy moth egg clusters have been creosoted as follows: In Massachusetts, 217,536; in Connecticut, 73,225; and, in Vermont, 39,393. During the month all of the gypsy moth foremen were brought together at a centrally located camp, to discuss the work. At this meeting the foremen were encouraged to point out camp conditions that tended to retard gypsy moth work. The points developed were taken up with the proper State officials, resulting in steps being taken to correct some unsatisfactory situations. This office has had cooperation from the U. S. Forest Service, the Department of the Interior, and State officials. The gypsy moth work, however, is only one of a great many projects under their direction and all projects have to be considered in the work programs. Arrangements have been made, through the State and Forest Service officials, to have workers in gypsy moth work clothed with woollen breeches and leggins. A regular Bureau supervisor has continued during the month in teaching the camp men in the use of ropes for climbing trees in connection with their work. The boys take readily to this method of climbing, and it will result in much less spiking of trees, which cannot be avoided when climbing irons are used. Talks on gypsy moth work have been given to the camp men and motion pictures pertaining to this work have been shown. A report of work covering the period from October 3, 1934, to January 2, 1935, and showing also the total amount of work done since July 1 was completed early in January and submitted to the proper State officials for their information.

PLANT DISEASE CONTROL

Effectiveness of blister rust control.--During 1934 plot and strip-line studies were made to determine the amount of blister rust infection on white pines in protected and unprotected areas in the Northeastern States. In protected areas in New Hampshire, New York, and Vermont, 27 plots, comprising 62.6 acres, were laid out in 20 towns and the white pines were examined carefully for infection. Out of a total of 14,191 pines, 2,982, or 21 percent, were infected with 4,250 cankers. However, only 139 of these cankers, or 3.3 percent, originated since the application of control measures. Infection conditions in protected areas were also determined in 23 towns in New York and New Hampshire by examining all pines under 20 feet in height on 13 miles of rod-wide strip lines. A total of 35 percent of the 15,808 pines on the strips were infected with 7,804 cankers, but only 2.4 percent of these infections had originated since the control work was performed. In unprotected areas plot studies were made in 30 towns in six States. The 36 plots comprised 35 acres. Blister rust had infected 10,230 white pines, or 49 percent of the 20,821 trees of this species. Most of the 20,584 cankers were of recent origin. In fact, 41 percent of them originated during 1930 and 1931, which shows the danger of delaying protection work.

Blister rust control in California in 1934, summary.--During the 1934 field season, extending from late in April through September, 18,177,243 Ribes bushes were eradicated from 190,935 acres of sugar pine timber land in California, using a total of 83,906 man-days of labor. This brings the total area now under protection in California to 261,963 acres. From this area have been eradicated 25,647,055 Ribes, of which 25,179,576 were removed during the initial work and 467,479 by subsequent workings of parts of the original areas. The total sugar pine area now under consideration for control treatment in California amounts to 2,000,000 acres, and at the close of 1934 the initial Ribes-eradication work was 13 percent completed. During 1934 both the Forest Service and the Bureau had allotments of P. W. A. funds for employing labor on blister rust control work in California, the funds of the Forest Service being for use on national forest lands, and those of the Bureau for use on State and private lands. Because of the generally intermingled ownerships existing in the sugar pine region, Forest Service and Bureau camps were combined for work on selected areas of sugar pine type, the ownership of which governed the ratio of funds involved. Field representatives of both the Bureau and the Forest Service believe that the joint undertaking of 1934 was not only generally satisfactory but mutually advantageous to each cooperator. With the rust not yet known to exist in California, the general plan of control now followed is to give first attention to the high-value sugar pine stands in the State and later, depending on the spread of infection, to treat selected areas of less value.

Ribes eradication in the Inland Empire.--Summarization of data on *Ribes*-eradication in the Inland Empire shows that during 1934, 3,786,640 man-hours of labor were expended in eradication work on 672,092 acres of western white pine type. Initial working was completed on 644,995 acres, second working on 25,886 acres, third working on 1,211 acres, and 228,011 acres were placed on a maintenance basis. Nearly 13,000 men were employed in this work, 7,270 men in 42 Civilian Conservation Corps camps being engaged in blister rust control; 4,430 men were employed in 146 N. I. R. A. camps operated with funds made available to the Bureau and the Forest Service from the N. I. R. A. allotment; and 124 men in cooperative N. I. R. A. camps, the Bureau and the State of Idaho cooperating. Late in the field season 400 men were employed with funds made available to the Washington Emergency Relief Administration and 330 men with Idaho Emergency Relief Administration funds. In addition, 230 men were used throughout the field season in checking the efficiency of *Ribes* eradication. To date eradication work in the Inland Empire has been accomplished on 1,129,321 acres, of which 1,076,323 acres have been given initial working, 51,787 acres have been given second eradication, a third working has been necessary on 1,211 acres, and 375,515 acres are now on a maintenance basis. This work has been accomplished with 6,293,088 man-hours of labor.

Barberry eradication in Ohio, South Dakota, and Colorado.--As a result of 37,680 man-hours of local labor employed in Ohio during the past year, 1,932 square miles of territory in Ashtabula, Lorain, Mahoning, Geauga, Portage, and Trumbull Counties were given a careful inspection for barberry bushes. Ninety-eight percent of the bushes found were killed with salt. Those so situated that chemical eradication might injure valuable shrubs or trees were dug. About 140 tons of crushed rock salt were purchased in car lots direct from salt-manufacturing companies and distributed to crews as needed. The crop situation in South Dakota during the past season was by far the worst in the history of the State. Grain production in 1934 was about 8 percent of the 5-year average and approximately 32 percent of the 1933 crop, which was the smallest on record up to that time. The annual precipitation during the 3 previous years was approximately 12 inches, or 20 percent below normal. From January to August precipitation was deficient and temperatures were abnormally high. According to R. O. Bulger, Brooking, S. Dak., some rust developed in a few areas in the State where there was considerable rain during the latter part of June and the early part of July, but was not sufficient to cause noticeable damage. In Colorado during the 1934 field season, 28,212 barberry bushes were destroyed. Six crews of 6 men each, employed with P. W. A. funds, began work early in May and continued through the early part of December. Eradication was conducted in countie where extensive areas of infestation were known to exist. In the San Luis Valley (southwestern Colorado) approximately 2,000,000 bushels of small grains ar produced annually. *Berberis fendleri* is native in the hill areas of this part of the State. It is one of the few districts in the barberry eradication area where a barberry susceptible to the stem rust fungus is native. Owing to the extent of the eradication problem in this area, various methods of treating bushes were tested. Although salt is considered an effective killing agent and otherwise suitable for treating bushes in most of the barberry eradication area, it did not prove particularly adaptable in the larger patches of B. fendleri growing on the uncultivated lands adjacent to the Valley. A commercial mixture of 1½ pounds of sodium chlorate and calcium chloride with 3 gallons of water, applied to 1 square rod of barberry bushes, apparently gave an effective kill at a cost of approximately 12 cents per square rod. During the 1934 season 414 illustrated talks were given before approximately 10,000 people in Colorado and Wyoming, consisting of school children and adults. As a result of this educational campaign, 288 scattered barberry bushes have been reported. Often the report of a single bush has led to the eradication of many found growing in surrounding territory.

COTTON INSECT INVESTIGATIONS

Toxicity tests with the cotton flea hopper.--K. P. Ewing and R. L. McGarr have reported on cage toxicity tests with the cotton flea hopper, conducted at Port Lavaca, Tex., during 1933. From July 15 to September 11 a total of 417 cage tests were conducted, using 50 insects in each test. Little difference in the mortality was caused by the four different brands or fineness of the sulphurs used and all were more effective against the nymphs than against the adults. Wet mixtures of 25 percent paris green and 75 percent calcium arsenate killed from 81 to 91 percent, respectively, of the adults, and the dry mixtures of the same materials killed 8 to 10 percent less than did the wet mixtures. Home-made dry mixtures were from 10 to 20 percent less effective than factory mixtures of the same materials. The kill from all the mixtures made of a special air-floating paris green were consistently higher than those made of regular commercial paris green. Increasing the amount of regular paris green to 50 percent in mixtures with calcium arsenate and lime and to 80 percent in mixtures with lime did not increase effectiveness. All of these mixtures killed from two to three times as many adults as nymphs. The substitution of from 25 to 50 percent lime for equal quantities of calcium arsenate in the mixtures of paris green considerably reduced the kill. Sodium fluosilicate gave the highest kill of any insecticide tested in the cages, killing 87 percent of the adults and 83 percent of the nymphs. However, in field tests this material gave practically no control, owing to its poor dusting qualities and the burning of plants under certain conditions. The mortality from derris containing 4 percent rotenone was again very low. Copper arsenite (20, 25, and 50 percent) in factory and home-made mixtures with calcium arsenate gave good control of both adults and nymphs. Again the factory mixtures were more effective than the home-made mixtures. The substitution of lime for the calcium arsenate in the copper arsenite mixtures considerably reduced its effectiveness. Copper arsenite has very poor dusting qualities and also burns the foliage.

Biology of Microbracon mellitor (Say) in relation to the boll weevil.--Reporting on observations at Tallulah, La., during 1934, J. W. Folsom and Perry A. Glick state that when a healthy boll weevil larva is placed in an artificial cell, made by splitting a sound cotton square, removing the contents, and pinning the halves together again, the parasite M. mellitor will oviposit on the weevil larva just as usual, preferring to insert its ovipositor through the slit that it finds already made. This parasite is not likely to deposit its eggs on boll weevil pupae. Of 30 pupae placed in these artificial cells on only one was a parasite egg deposited. The parasites did not lay their eggs on or pay any attention to naked boll weevil larvae placed in the cages with them.

The M. mellitor female usually begins to lay eggs on the second day after emerging but sometimes not until the third day. She first stings and paralyzes the weevil larva and then lays an egg on or near it. The time required for oviposition ranged from 3 to 90 minutes. Usually 1 or 2 eggs were laid each day during the summer. One female laid 48 eggs in 37 days. Usually only 1 egg was found with each weevil larva, rarely 2, but in one instance 4 eggs were found. After the weevil grub is paralyzed it remains alive but motionless in the square and the pulsations of its dorsal vessel are reduced from about 50 to about 25 per minute. During August the eggs usually hatched in less than 24 hours, but after frost in November and December the eggs required from 4 to 12 days to hatch. During the summer the growth of the larva is rapid. In about three days it becomes full grown, stops feeding, and spins a cocoon. It remains in the cocoon as a larva for about 6 days and as a pupa for about 3 days. Although the normal period from hatching to eclosion was 12 days, this developmental period ranged from 7 to 16 days, chiefly according to the temperature, with a few late individuals taking even longer to reach the adult stage. The eggs from mated females produced both males and females. Parthenogenesis occurs among these parasites as among many of their relatives and, as expected, all the eggs from unmated females produced only males. Females mated with these parthenogenetic males produced normal offspring of both sexes. M. mellitor probably passes the winter as larvae in cocoons.

Spread of Fusarium wilt by insects.--A report on the second season's work on dissemination of Fusarium wilt has been submitted by L. D. Christenson, College Station, Tex., working in cooperation with J. J. Taubenhaus, Plant Pathologist of the Texas Experiment Station. In these studies the insects found in cotton fields were divided into three categories: (1) Aerial forms that feed on cotton; (2) miscellaneous insects not feeding on cotton and which may transport spores by adherence to their appendages; (3) soil-inhabiting organisms. Representatives of each group were studied to determine their relative importance as disseminators of the fungus-causing wilt. Among the aerial cotton feeders, 15 species of Orthoptera, the boll weevil, and the cotton leaf worm were selected for study. Specimens were collected from wilt-infested fields at College Station, Beaumont, and in Caldwell County, Tex. After external sterilization in a solution of bichloride of mercury, either the entire insects or their stomach contents were cultured in sterile agar plates to determine whether they contained viable Fusarium fungi. Eight hundred and fifty grasshoppers (chiefly Locustidae) were cultured. On the basis of population counts made the previous season, this represents all grasshoppers on 2.32 acres of cotton. Twenty-three percent of the whole insects and 12.5 percent of the stomach contents cultured showed Fusarium growth, indicating that the external sterilization was not entirely effective in reaching all parts of the body. There was little difference in the percentage of positive cultures from the different species, and the importance of the species in disseminating wilt depends upon their abundance. There was no way of determining whether the grasshoppers were infective in a direct ratio to the percentage of plants infected with wilt, as all fields ultimately had three-fourths or more of the plants diseased. Tests with leaf worm and boll weevil were largely to determine whether the fungi in the larvae remained viable during larval transformation. Only a small percentage of pupae and adults from leaf worm larvae fed on leaves containing an abundance of spores produced Fusarium growth when cultured Those few cases may have been due to noneffectiveness of external sterilization and apparently in most cases the fungus is expelled in the final evacuation of the alimentary tract or is killed during histolysis. A small percentage of boll weevil larvae, pupae, and adults collected from within squares and bolls on wilted plants also produced Fusarium growth. However, as cultures of plant portions from the inside of bolls from diseased plants did not result in a growth of wilt fungus, it cannot be concluded from these experiments that pupation of the weevil is equivalent to elimination or destruction of the fungus. In the second group of miscellaneous insects not feeding on cotton tests were made for carriers of externally adhering spores of Fusarium. Adults of Lepidoptera, Orthoptera, Hymenoptera, and Odonata were knocked down with swatters or picked up with sterile forceps in badly wilted fields. Pedal appendages were detached and cultured without sterilization. About one-third of the 92 adults tested were found to be carriers of wilt. The third group of smaller soil animals, mostly Collembola and Acarina, were cultured with and without sterilization. With the one exception of an unsterilized check, all cultures of Collembola resulted negatively. At the same time these organisms showed marked avidity for Fusarium vasinfectum material in pure slant cultures, eating and existing for long periods of time. These forms, which are mainly saprophytic, have apparently become adapted so as to digest the elements of which fungi, and spores in particular, consist. It is also remarkable that Collembola do not often carry the fungus adhering to their bodies. Other smaller soil animals also apparently have no marked proclivities for transporting fungus material, either internally or externally. Experiments in 1933 showed that the fecal pellets of a number of insects contained viable Fusarium material. Further experiments were conducted this year to determine how long the fungus would remain viable and whether cotton plants could be inoculated by means of pellets. Infective pellets of Melanoplus differentialis Thos., dried and stored in a dry place, remained infective for at least 9 months. Pellets from other Locustidae left exposed on the soil out of doors, exposed to temperatures of 65° C., also remained viable for several months. Cotton growing in both sterilized and unsterilized soil was infected with wilt by placing considerable quantities of infective fecal pellets near the tap roots. Only two or three pellets were required to produce infection when placed in a slot cut in the tap root 1 inch below the soil surface. Large quantities of inoculum are necessary to bring about wilt infection under laboratory conditions. As insects continuously defecate infective pellets, they may be important in intensifying the fungitic elements in the soil.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Control work in Florida.--The eradication of wild cotton in southern Florida has continued to make good progress. Most of the old colonies along the west coast have again been recleaned, and the inspectors are now devoting some time to scouting for new colonies. Several new colonies, most of them less than an acre in extent, have been located on shell ridges back in the swamps and on very small keys. Several crews are now working on the keys crossed by the Overseas Highway. At Cape Sable most of the area covered during the last clean-up has again been recleaned. During this recleaning the crews are cutting trails crossing at right angles those cut during the previous cleaning, and this procedure is resulting in readily finding mature plants that were missed when the old trails were used. The inspectors have continued the practice of examining wild cotton bolls from time to time, and on January 5 a specimen of the pink bollworm was found at Cape Sable, the first specimen found since the work was resumed last November.

Clean-up and trap-plot work in Texas.--Field clean-up in the Big Bend of Texas was completed on January 12, making the third consecutive year this work has been carried on. A total of 3,891 acres was cleaned, 110 of which were in Brewster County and the remainder in Presidio County. Generally speaking, the fields were harder to clean this year than ever before, because the cotton began opening very rapidly after the last irrigation, the farmers did not give the fields any further cultivation, and grass and weeds made considerable growth. Excellent cooperation was received from the farmers and they have already signified their intention of again observing the uniform planting date of April 15 or later. Plans are being made to carry on trap-plot work also. These tentative plans call for two half-acre plots in Brewster County and 8 plots of one-fourth acre each in Presidio County. Such good results were obtained by using field-planted plots in Brewster County last year that all of the plots will be planted in the field this year instead of growing the cotton in hotbeds and later transferring it to the fields. All of the work in connection with the plots--preparation, plating, irrigation, and cultivation-will be done by the farmers without any expense to the Department, and our work will start when the blooms begin to open, which will probably be the latter part of May. The Marfa, Tex., road station was discontinued on January 4, as field cleaning had progressed to a point where there was no danger of infested material being taken from the Big Bend. This season only 6 interceptions were found to be infested with the pink bollworm, 41 living and 25 dead specimens being taken, whereas last season 20 infested interceptions containing 122 livin and 34 dead specimens were made. This is due principally to a reduction of the infestation by the control program, and also to the fact that the people living in the Big Bend have learned the necessity of thoroughly cleaning their cars before leaving the area.

Thurberia weevil in Arizona.--Early last December an infestation of Thurberia weevil was found in a 200-acre cotton field at Sahuarita, about 18 miles south of Tucson, Ariz. Another infestation was found in cotton about 3 miles north of Tubac, which is about 38 miles south of Tucson. The latter infestation was the heaviest, one half-acre plot showing 9.75 percent and a 4-acre plot 2 percent, while a third small plot did not show any infestation. The cotton was planted very late in the season, which accounts for its having been missed when an acreage survey was made last fall. This cotton has just been ginned, and close inspection of the trash and of some 10 bushels of seed gave negative results. This infestation undoubtedly occurred late in the season, so that the open cotton would hardly be infested, whereas infestation in the unopened bolls, which did not reach the gin, was fairly heavy.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Celery leaf tier populations low in Florida.--C. F. Stahl, of the Sanford, Fla., laboratory, reports that field examinations in the Sanford district the middle of January indicated a decided scarcity of *Phlyctaenia rubigalis* Guen. throughout the district. Evidence of the active presence of the insect was found only at one farm directly south of Lake Monroe. This district had suffered slightly from the December freeze. An average of approximately one larva per plant was found on the largest celery in the district, although all stages of the insect were present. However, the cold weather has delayed develo ment of the larvae so that the celery will be harvested without any appreciable injury from the leaf tier. It is anticipated that the harvesting of this crop (which incidentally removes the small larvae), combined with the cold weather, should effectually check any possibility of an outbreak in the Sanford district in the immediate future.

Small quantity of pyrethrum kills celery leaf tier.--In computing the amount of pyrethrum dust applied to an individual celery plant in dusting for the control of *Phlyctaenia rubigalis* Guen., C. B. Wisecup, Sanford, has estimated that each plant is contacted by approximately 0.226 grain, or 0.0079 ounce of dust. This amount of dust corresponds to the quantity that can be lifted easily on the blade of an ordinary pocket knife. Rough calculations following the measurement of representative leaves from different portions of a medium-sized celery plant demonstrated that such a plant possesses an average of approximately 9 square feet of leaf area on each of its surfaces (upper and lower), or a total of approximately 18 square feet of leaf surface to be contacted by the pyrethrum dust in order to combat the celery leaf tier successfully. As approximately 25 pounds of pyrethrum dust per acre is applied for celery leaf tier control, and as such dust contains equal quantities of pyrethrum and tobacco dust, it is evident that a very small quantity of the active ingredient of pyrethrum is lethal to the leaf tier.

Temperature changes affect food consumption by beet wireworm larvae.--M. W. Stone, of the Alhambra, Calif., laboratory, reports that the amount of food consumed by larvae of *Pheletes californicus* Mann. varies with the changes in temperature, according to results obtained in cage tests. At a temperature above 70° F. the larvae of this species were exceedingly active, eating an average of from 6 to 15 kernels of wheat per month per individual, whereas when the temperatures were 60° or lower an average of less than 2 kernels per month per individual were eaten. In the course of these experiments, newly hatched larvae were confined in individual containers and were furnished 6 kernels of wheat weekly. Inspection of the wheat at such frequent intervals rendered it possible to determine accurately the food requirements of the larvae. It was noted that the greatest number of kernels were eaten by the larvae when they were 3, 4, and 5 months old. Previously it was believed that first-year larvae, on account of their small size, were incapable of inflicting any great amount of injury to their host plants. However, these cage results indicate that such larvae are undoubtedly responsible for an appreciable share of the damage inflicted to late summer and fall vegetable crops in the Alhambra district.

Low temperatures kill hibernating pea weevils in Idaho.--T. A. Brindley, Moscow, Idaho, reports that the low temperatures in January, during which a minimum of -20° F. was recorded at Moscow, have resulted in a heavy mortality of the hibernating pea weevils. This mortality included the individuals hibernating under the bark of the ponderosa pine. Previous studies have indicated that such a location provides very effective hibernating quarters for the weevil, resulting in a minimum percentage of winter mortality, in comparison with other hibernation quarters. At the close of January the field observations indicated that approximately 33 percent of the pea weevils hibernating under the bark of ponderosa pine were dead. Complete mortality occurred among weevils in prepared hibernation cages used in studies of winter mortality.

Notes on the lima bean vine borer.--In summarizing the results of field observations on *Monoptilota pergratialis* Hulst. on the Eastern Shore of Maryland during the 1934 season, L. W. Brannon, of the Norfolk, Va., laboratory, reports that probably two broods of this insect develop during a season and that the winter is passed in the pupal stage just below the soil surface. In certain parts of some of the fields under observation this insect caused appreciable damage. In field control experiments, utilizing barium fluosilicate, cryolite, magnesium arsenate, potassium hexafluoaluminate, and derris as sprays and dusts, no conclusive results were obtained as the infestation was comparatively light on the experimental plots.

Early blooming of wild host plant may reduce lima bean pod borer infestation.--Rodney Cecil, Ventura, Calif., reports that common lupine (*Lupinus succulentus* Dougl.), one of the most important wild host plants of the lima bean pod borer (*Etiella zinckenella* Treit.), began blooming on January 5 and was in full bloom by January 31 in the mountainous region adjacent to the lima bean section of the Ventura district. Ordinarily this plant begins blooming the middle of March, and in the past a large crop of lupines has indicated that a large brood of *E. zinckenella* will emerge from this wild host plant and infest the cultivated lima beans. As the lupine is blooming so early this year, it is likely that the plants may mature before the adults of *E. zinckenella* emerge from hibernation in the lima bean fields. In this event the wild-host brood will be materially reduced in number, therefore there will be very few adult borers to migrate to the cultivated lima beans.

Soil conditions affecting infestation by narcissus bulb fly.--Ralph Schop of the Sumner, Wash., laboratory, in determining the effect of the type of soil and the depth of planting (4, 6, and 8 inches) on the degree of infestation by the narcissus fly (*Merodon equestris* Fab.) found a greater survival of larvae i peat soil than in silt and the greatest survival at a depth of 6 inches.

INSECTS AFFECTING MAN AND ANIMALS

Screw worm activity.--W. E. Dove, of the Savannah, Ga., laboratory, reports as follows: "On several occasions screw worms were reported in wounds in the open-range sections of Georgia, but we have been unable to collect specimens and rear the larvae from animals in this State. In each case the stockman reported that the wound had a bloody discharge, characteristic of true screw worms. When such farms were visited our F. E. R. A. men invariably found that the wound had been treated with benzol and pine-tar oil. Some larvae from an untreated hog sent to us from Fernandina, Fla., were reared and identified as *Cochliomyia americana* Cushing and Patton. Even though screw worms are active in January, we contend that this is the season for surgical operations and we recommend pine-tar oil as a healing agent."

Effect of woods burning on screw worm and gulf coast tick.--Mr. Dove also reports: "Last fall the cattle entered the swamps where they spent most of the winter. In such places they browse on canes, evergreens, and grass protected by trees. These cattle are in very good condition. It is the custom of the stockmen to burn over the higher woods land in January and February. When the new grass begins to grow the cattle migrate from the swamps to the cut-over lands. It is estimated that one-third of the higher lands were burned by the end of Jan ary. As most of the woods burning usually takes place in February, we can expec a very high percentage of burning for the season. During the past 3 years burning was curtailed by forest workers in their efforts to preserve forest seedlings. On account of the accumulations of leaves and pine needles, some of the present fires are very destructive to young trees. The actual burning of the woods would have little or no effect on screw worm larvae and pupae in the soil, but the heat of the fires would be sufficient to kill most of the larvae of the gulf coast tick (Amblyomma maculatum Koch.). It is not too early to predict that the gulf coast tick will be less abundant in Georgia this summer and that because of this and the use of better animal management, screw worms will be less numerous this year."

Screw worm activity in Florida not stopped by December freeze.--Numerous screw worm cases in livestock are reported to have occurred in northern Florida in January. Larvae from several cases sent to W. V. King have been reared and proved to be C. americana. The second cold wave, which struck the northern part of Florida on January 23-29, checked the activity of the flies and permitted the healing of many previously infested wounds in livestock.

FOREIGN PARASITE INTRODUCTION

European field laboratories consolidated.--The Budapest, Hungary, laboratory, concerned with the study of forest-insect parasites, has been discontinued and W. F. Sellers has been transferred to Hyeres, France. The Hyeres laboratory, with H. L. Parker in charge, assisted by H. D. Smith and Mr. Sellers, will hereafter conduct parasite work of the division in Europe and the Mediterranean region.

Alfalfa weevil parasites sent to California.--Two consignments of adult Peridesmia phytonomi Gahan, an egg parasite of the alfalfa weevil, were forwarded by H. L. Parker to H. S. Smith, Berkeley, Calif. They were forwarded by ordinary mail to New York and by air mail from New York to California. The first consignment arrived at Berkeley on February 2 and, according to Mr. Smith, the parasites were in excellent condition, the survival being 95 percent.

Pink bollworm parasites from Egypt.--In January two shipments of Microbracon brevicornis Wesm. were forwarded by H. L. Parker from Europe. The shipments comprised 89 adults and 237 cocoons and arrived at Presidio, Tex., in excellent condition, adult survival being 63 percent. A 90 percent emergence was obtained from the cocoon material. This is the "strain" or "race" obtained from the pink bollworm in Egypt and is intended to replace the corn borer strain, which has been unsuccessfully colonized during the past 2 years. In the rearing work at Hyeres this strain could not be reared satisfactorily on corn borer larva

Larch sawfly parasites shipped to Canada.--R. W. Burrell, of the Yokohama, Japan, laboratory, has recently forwarded 48,000 field-collected cocoons of the larch sawfly from Hokkaido to the Dominion Parasite Laboratory at Belleville, Ontario. A. B. Baird reports that the shipment arrived in excellent condition and shows a high percentage of parasitization by species of Tachinidae. The work on sawfly parasites in Japan and Korea is a cooperative activity with the Canadian Department of Agriculture.

Light gypsy moth infestation in Hungary.--Observations by W. F. Sellers during the past season reveal a very light egg population carrying over the winter of 1934-35. Of the areas scouted, 74 percent showed no infestation, 26 percent showed scattered or scarce infestation, a few showed medium infestation, and there were no heavy infestations. This decline has been taking place for several years and the situation offers a striking contrast to that of 1931, when only 2 percent of the areas showed no infestation and 50 percent were heavily infested.

FOREIGN PLANT QUARANTINES

Recent entomological interceptions of interest.--Twenty-five living larvae of the Mediterranean fruit fly were intercepted last October at San Francisco in three avocado fruits in stores from Hawaii. Larvae of this fruit fly were also taken at New York on November 21, 1934, in apples, persimmons, pricklypears, tangerines, and oranges in baggage from Italy. A larva of the European corn borer was intercepted at Philadelphia in a broomcorn stem in the mail from Italy. Living specimens of the Philippine orange moth (*Prays citri* Miller) arrived at San Pedro, Calif., in 38 lemons in ship's stores from the Philippines. A scale insect, *Pseudodiaspis yuccae* (Ckll.), was found last June at Nogales, Ariz., on *Pedilanthus macrocarpus* in cargo from Mexico. A living specimen of *Nysius ementitus* Dist. (Lygaeidae) was taken at New Orleans in banana debris in cargo from Honduras. Living specimens of *Laspeyresia splendana* Hbn. (Olethreutidae) were intercepted last October at New York in chestnuts in the mail from Germany. A living weevil, *Madarus distigma* Boh., was taken at Mobile, Ala., in banana debris in cargo from Honduras. Living larvae of the weevil *Curculio nucum* L. were intercepted at Philadelphia in hazelnuts in the mail from Lithuania.[1] Living specimens of the weevil *Lechriops psidii* Marshall were found at Del Rio, Tex., in guavas in baggage from Mexico. Larvae of *Ereunetis minuscula* Walsm. and *Opogona omoscopa* (Meyr.) (Tineidae) arrived at San Francisco on pineapples in cargo from Hawaii. A living specimen of the citrus leaf miner (*Phyllocnistis citrella* Stainton) was intercepted at Seattle, Wash., in a kumquat leaf in ship's quarters from Japan. The larvae of this tineid mine the leaves of young nursery stock in the Orient. The cocoon is usually placed at the edge of the leaf, which is rolled up.

Recent pathological interceptions of interest.--Our second interception of *Cercospora capsici* Heald and Wolf was made at New York on a pepper from Cuba. *Coniothyrium* sp. was intercepted at Seattle on January 3 on *Cornus mas* from Bulgaria. The only previous disease interception on *Cornus* was *Botrytis* sp. *Dematium pullulans* De Bary was intercepted on plums from Chile on January 16 at New York, our first interception of this genus. *Ceratostomella* (*Graphium*) *ulmi* (Schwarz) Buisman was found in elm logs from France on November 20 at Baltimore, according to a report from the culture laboratory. Walnut logs from Turkey examined December 31 at Baltimore were discolored by *Hemitrichia vesporium* (Batsch) Macbride (a myxomycete), our first interception of the genus. Our first interception of *Heterodera marioni* (Cornu) Goodey on *Kalanchoe* sp. and on *Euphorbia punctata* were made at New York on January 29 in plants from South Africa. Our first interception of *Marsonia potentillae* var. *fragariae*

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[1] *Correction.*--In the Bureau of Plant Quarantine News Letter dated December 1, 1933, p. 1, line 18, *Curculio micum* should read *Curculio nucum*.

Sacc. was made at Seattle November 28 on leaves of Fragaria fukuba from Japan. Our first interception of Microdiplodia wistariae Grove was made at Seattle on December 12 on stems of Wisteria multijuga from Japan. Tulip bulbs from Holland intercepted at New York on January 15 bore masses of red "dust" in addition to Penicillium sp. spore masses, this red dust consisting of the spore balls of Papulospora parasitica (Eid) Harz, our first interception of this disease. Some workers do not consider the warty globose bodies to be actual spores, but the manner of production and distribution is similar to that of some spores. Our first interception of Phoma camelliae Pass. was made at Seattle December 15 on several named varieties of Camellia japonica from Japan. Our second interception of Phyllosticta cynarae West was made at New York on globe artichokes from France. A Phyllosticta sp. with spores smaller than any found described as occurring on Camellia was intercepted at Seattle on December 13 on Camellia japonica from Japan. A leaf spot of croton intercepted at New York on December 5 on croton from Bermuda was caused by Phyllosticta sp., perhaps the undescribed species mentioned in the Report of the Bermuda Department of Agriculture for 1927. Phyllosticta sp. was intercepted at Seattle on November 30 on scales of lily bulbs from China, our first interception of a Phyllosticta on lily. Polythrincium trifolii Kze. was intercepted January 14 at the Washington Inspection House on hop clover leaves from Turkey. The only previous interception of this genus was the same disease on clover from British East Africa. Sclerotia of Sclerotinia sclerotiorum (Lib.) Mass. were found on radish seed from Turkey at the Washington Inspection House January 15, our first interception of this species on radish. Our first interception of Schizophyllum commune Fr. from Turkey was made at Baltimore December 31 on walnut logs. Our first interceptions of Sclerotiopsis testudinea Dearness were made at Seattle on December 12 and 18 on peonies from Japan. Septoria citri Pass. was intercepted January 16 at Portland on a lemon from India, our first interception of this disease from Asia. Our first interception of Sphacelotheca sorghi (Lk.) Clint. from South America was made at New York on January 11 in broomcorn from Argentina. Cones of Picea abies from Norway intercepted December 26 at Philadelphia bore numerous rust sori of Thecopsora padi (K & S) Grove, our first interception of the genus.

New names for lima bean fungi.--Attention is called to the article by S. C. Bruner and Anna E. Jenkins, "Identity and Host Relations of the Elsinoe of Lima Bean" (Jour. Agr. Research 47:783-789, Nov. 15, 1933). In accordance with this article records of Elsinoe canavaliae Rac. on lima bean should be changed to E. phaseoli Jenkins. The disease of lima beans discussed on page 24 of the News Letter for January 1, 1935, is the subject of an article entitled, "Colletotrichum truncatum (Schw.) n. comb. on Garden and Lima Beans", by C. F. Andrus and W. D. Moore (Phytopath. 25:121-125, Jan. 1935).

Insect on leek.--The occurrence of a leaf-boring larva of Acrolepia assectella Zell. in imported leeks was reported in the Plant Quarantine News Letter dated February 1, 1934. This record from the Netherlands is now supplemented by the finding of the insect in New York on January 23 in leaves of leek in ship's stores from Italy. It is said to damage garlic and leeks in France and to be a pest of onions in Russia.

Praying mantis causes flurry.--An inspector looking for stowaway insects in the debris in the hold of a ship unloading bananas at Galveston, Tex., noticed a considerable commotion and found a laborer out of the carrying line trying to jar something loose from his bunch of bananas. Meanwhile the other laborers were calling for the "bug doctor" or the "leaf man", as they term the inspector, because of his interest in examining the leafy trash in such shipments. The excited laborer finally shook out on the deck a huge praying mantis. The Mexican laborers regard this as a very poisonous insect, calling it the "cow-killer" or "mule killer", believing that if it is eaten by an animal feeding on grass where it is hiding the animal will sicken and die. There appears to be no scientific basis for this popular belief.

Mangoes refused entry.--The importation of mangoes is generally prohibited on account of the outstanding susceptibility of this fruit to fruit-fly infestation. Twenty-five cases of fresh mangoes arriving at Seattle, Wash., from Singapore January 22, each fruit lightly wrapped in netting and dipped in paraffin, were refused entry and taken out to sea to be destroyed.

Inspecting ocean linger a huge task.--Some idea of the magnitude of the work involved in inspecting one of the large passenger vessels arriving at our ports in constant succession throughout the year is given by the following records obtained while inspecting one of these huge floating cities, the Conte di Savoia, which arrived in New York on November 21, 1934. This boat carried a crew of 841 and a passenger list of 1,053, that came aboard at four different ports in three countries, Italy, France, and Spain. Seventy-four customs inspectors were on hand to examine the passengers' baggage, and five plant quarantine inspectors were present to deal with the plants and plant products found in the examination. These passengers carried a miscellaneous assortment, consisting of 134 plants, cuttings, small trees, etc., of 16 different kinds, and 1,090 fruits of 16 kinds, in addition to 10 pounds of green olives, these plant materials coming from Italy, France, Spain, Greece, and Austria. The stores of this vessel contained 5,125 pounds of 16 different vegetables, practically all from Italy, and several crates of artichokes, kale, and peppers, in addition to 40 cases of lemons, 60 melons, and 15 cases of Spanish grapes. Several hundred decorative plants were scattered in various salons, cabins, and promenades, and a special detail of inspectors was assigned to these stores and plants, and to accompany the 26 customs inspectors who searched the hundreds of places in cabins, lockers, and crews quarters where contraband might be concealed. This record does not include inspection of the sizable cargo also carried aboard this vessel, which was subsequently inspected on the dock. The inspection in all cases had to be prompt, in order to facilitate the landing of the passengers and the discharge of cargo, for the ship sailed again within 50 hours from the time of arrival. The contraband plants and fruit taken from baggage were examined to some extent before they were burned in the city incinerator, and this partial examination disclosed the presence of 24 plant diseases and 76 insects. The latter included the Mediterranean fruit fly in five different kinds of fruit from Italy (prickly-pear, tangerine, orange, apple, and persimmon). By far the greatest proportion of the plants, fruits, etc., found in passengers' baggage came from Italy, and 80 percent of such seizures were found in the effects of the third-class passengers.

DOMESTIC PLANT QUARANTINES

Transit inspection at southern points.--Taking advantage of the dull nursery-stock shipping season, inspectors are making limited inspections of shipments in transit at Memphis, Dallas, and Fort Worth, and are obtaining information on the volume of nursery stock and restricted products that may be available for inspection at these points. St. Louis will also be included in the tour.

Bus line to carry more express.--One of the interstate bus lines operating between New York and Chicago is increasing its equipment for a more extensive express business, and transit inspectors at these points are looking into the possibility of nursery stock being transported in this manner, and are considering the advisability of including the bus terminals in their inspection tours.

Citrus canker inspection.--In January inspections were made of 325 properties in 7 counties in Texas, and 138 properties in Beauregard and Vernon Parishes, La., the work being carried on cooperatively with these States. Arrangements are being completed with State officers of Alabama and Mississippi for limited winter inspections of from 6 to 12 weeks on a cooperative cost basis. No inspection for citrus canker, other than regular State inspections of nursery stock, has been done recently in these two States.

Citrus canker recurring in Galveston area.--Citrus canker was found recently at three new points in the Galveston, Tex., area, where the disease has been outcropping in recent years. Each of these infections was on Citrus trifoliata, one tree being near League City, one near Alta Loma, and two near Arcadia. The infected trees and all other citrus on the properties concerned were, with the cooperation of the owners, destroyed. The fact that all of these were abandoned or wild trees shows the necessity for the intensive inspections now being carried on in this area. These findings do not necessarily mean that the disease is spreading, but probably represent old infections on previously undiscovered trees. Intensive inspection is being made of all wild or abandoned citrus in wooded bayous, fence rows, ditch banks, and abandoned plantings. Such trees are destroyed when found, if practicable, and all remaining citrus trees are plotted at the close of each day on a U. S. Geological Survey quadrangle for use in future eradication. At Dickinson, where a severe epidemic occurred a year ago, inspections are being made of elaborate home plantings, as well as of woodlands, and no additional infection has thus far been found in this immediate area. Recent freezing weather has caused defoliation and the killing of some citrus trees in this area.

Narcissus bulb quarantine revoked.--Secretary Wallace has announced that Federal domestic quarantine No. 62, which relates to the interstate movement of narcissus bulbs, will be revoked, effective April 1, 1935. "Attempts at general eradication have not been successful", the announcement states, "the pests occurring year after year in most areas where such attempts have been made. Furthermore, both the eelworm and the greater bulb fly have become more widespread, now being established in commercial narcissus-bulb plantings in many States in addition to the ones in which they were known to occur at the time the quarantine was established. * * * The removal of this quarantine leaves to interested States freedom of action in the establishment of such State restrictions as they may deem advisable."

Stock infested with peach borer culled.--Nurserymen in several States were assisted in January by Federal inspectors in culling out peach stock infested with the peach root borer (Aegeria exitiosa Say). This work is in cooperation with States which require such culling, tree by tree at digging time, as a condition of shipment of peach and nectarine stock from areas infected with the phony peach disease.

CONTROL INVESTIGATIONS

Standard insecticide found for tests of fly sprays.--There has long been need for a synthetic crystalline organic compound that would be sufficiently toxic in kerosene solution to serve as a standard of comparison in tests of kerosene extracts of pyrethrum and other materials against house flies. Phenothioxin, a compound made by L. E. Smith of the Insecticide Division, was found by F. L. Campbell and W. N. Sullivan, Takoma Park, Md., to be suitable for this purpose in their turntable method.

Old samples of pyrethrum may be less toxic than pyrethrin.--Tests made by W. N. Sullivan, Takoma Park, Md., and G. D. Reynolds, Food and Drug Administration, Beltsville, Md., of six samples of alcoholic extracts of pyrethrum against house flies, showed that the oldest samples were not as toxic as their pyrethrin content indicated. The extracts were prepared and analyzed by J. J. T. Graham, of the Food and Drug Administration.

Technique for injecting insects with poisons.--N. E. McIndoo, Takoma Park, Md., having finished his bibliography on tobacco and nicotine, has begun a study of methods for the quantitative injection of poisons into insects. As a starting point in this work, he is using Trevan's micrometer syringe.

BEE CULTURE

Travel incident to honey production.--Statistically minded writers have figured out that in preparing a pound of honey, bees fly about 40,000 miles. So far no one has determined how many miles by truck and automobile the modern beekeeper must travel in producing and marketing his pound of honey. F. E. Todd, Davis, Calif., reports that a survey by the Pacific States Bee Culture Field Laboratory, in cooperation with the University of California, including 225 California beekeepers who produced in 1933 a honey crop of 6,130,181 pounds, has shown that these beekeepers traveled 1,493,628 miles, which is equivalent to 0.24 mile per pound of honey. At this rate the entire crop of that year must have caused the California beekeepers to travel 2,880,000 miles. Use of automobiles varies with the type of apiary. In Oregon and Intermountain States, where beekeeping is nonmigratory for the mo part, about 10 percent of the cost per pound of honey is due to transportation, whereas in the migratory apiaries in California transportation accounts for from 20 to 25 percent of the cost. While the raw materials for honey come from nearby plants, the production of honey under modern conditions is aided by rubber, iron, gasoline, and other materials obtained from many distant parts of the world, another demonstration of the complexity of modern civilization.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Rare cerambycid received.--W. S. Fisher states that he has received from Dr. Emanuel Ducasse, Port-au-Prince, Haiti, a specimen of the very rare cerambycid beetle *Derancistrus* (*Prosternodes*) *obenthuri* Gahan for deposit in the national collection.

Parasites of Parlatoria blanchardi Targ. in the United States.--Parasitized specimens of *Parlatoria blanchardi*, collected in the Coachella and Imperial Valleys in California by F. S. Stickney, were recently examined by A. B. Gahan and the parasites tentatively identified as *Prospaltella* ? *aurantii* Howard and (*Signiphor*) *Thysanus* ? *flavopalliata* Ashmead. The parasite material was not entirely mature and hence it is impossible to identify them positively to species. The record is interesting as being apparently the first identification of a parasite of this scale insect in America.

The sugarcane mite (Tarsonemus spinipes Hirst) in the United States.--H. E. Ewing reports that the first record in the United States of the sugarcane mite (*Tarsonemus spinipes* Hirst) comes from a quarantine greenhouse at Arlington Farm, Va. Since the discovery of the infestation all the sugarcane in the vicinity of the infested house has been destroyed and the house has been fumigated.

First North American records for two European leafhoppers.--In connection with recent determination work for correspondents, P. W. Oman has had occasion to refer to and identify certain leafhoppers he collected in New England in August 1934. Of these, two are well-known European species, but apparently represent new records for North America. These are *Athysanus argentatus* Fab. and *Macropsis tiliae* Burm. The first is apparently a grass feeder, as are closely related species of the genus, while the second, as the name suggests, lives on *Tilia* sp. The latter species is commonly referred to by European workers as *Pediopsis tiliae* Burm. *M. tiliae* was collected at New Haven, Conn., and *A. argentatus* in the White Mountains of New Hampshire.

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BUREAU OF
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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR FEBRUARY 1935

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AGRICULTURAL APPROPRIATION BILL HAS PASSED THE HOUSE

The bill making appropriations to the Department for the fiscal year 1936 passed the House of Representatives on March 16 and has been referred to the Senate for consideration. In its present form the bill appropriates $7,778,921 for the Bureau of Entomology and Plant Quarantine, part of which will be immediately available if the bill becomes law. Two large items submitted as supplemental budget estimates are: $2,500,000 for a cooperative campaign for control of the chinch bug; and $480,000 for screw worm control, $55,000 of which will be allocated for investigations, the remainder to be used in a cooperative control campaign.

The House bill provides increases of $69,000 over the estimates submitted by the Budget. These increases are: $1,000, which is to be immediately available, for work on flower-spot disease of azalea; $33,000 for investigations on insects attacking tobacco in the field; $3,000 for enlarging the work on bee culture on the Pacific coast; $18,000 to the item "Control Investigations", for investigations on the entomological phases of the development of insecticides from tobacco by-products; and $14,000 to the "Insecticide Division", for chemical investigations on the same subject.

Included in the bill are appropriations for the following control activities, which during the present fiscal year are being financed solely from funds supplied from emergency appropriations: Gypsy and brown-tail moth control, white pine blister rust control, and barberry eradication.

FRUIT INSECT INVESTIGATIONS

Oriental fruit moth bait trap work transferred to Moorestown.--The work with baits and bait traps for oriental fruit moth control, which has been under way at Cornelia, Ga., since 1930, is being transferred to Moorestown, N. J. Northern Georgia is at the extreme southern limit of the range of the oriental fruit moth as a serious factor in peach production, and the infestations the last 2 years have been too light for satisfactory work. The fruit moth infestations in New Jersey, although somewhat reduced by parasites from the high level which existed a number of years ago, are considerably greater than those in the Cornelia section the last 2 years. The transfer of the fruit moth work to Moorestown will give it the benefit of the background of experience with bait materials that have been intensively investigated for the control of the Japanese beetle, and will permit closer contact with chemists. Wm. P. Yetter, Jr., will continue in charge of the bait-trap project.

Dried fruit beetle in grape pomace.--Dwight F. Barnes, of the dried-fruit insect laboratory at Fresno, Calif., has completed the examination of a second series of samples of fermenting grape pomace. As in the case of pomace sampled in the fall of 1934, the samples taken in winter showed that the peak of population of adults of the dried fruit beetle was reached 27 days after the pomace was deposited in a heap out of doors. In both cases the greatest abundance of larvae was found from the 8th to the 17th day after the pomace was exposed to infestation.

Winter mortality of larvae of raisin moth in California.--Samples of soil containing hibernating larvae of the raisin moth, collected by Heber C. Donohoe, Fresno, Calif., on January 16-21 and February 18-20, showed that mortality of larvae in dry soil averaged about 25 percent during both periods. The mortality of larvae in wet soil increased from about 34 percent in the first collections to about 68 percent 1 month later.

DATE SCALE CONTROL

Inspection results in California and Arizona.--During the month of February pruning and inspection were carried on in neglected date plantings in the Webb Subdivision in the Coachella Valley, Calif. Several plantings were found heavily infested in this subdivision in 1929. Systematic inspection and treatment were begun at once and the last infested palm was found in September 1931. Most of the plantings are now well pruned and can be inspected efficiently. Palms that are bushy with offshoots and excess foliage are being pruned and the removed foliage is being inspected. After being pruned the plantings are carefully inspected from ground and ladders. All leaf bases on previously infested Persian and seedling palms are cut back and examined. This will probably be the final inspection of these plantings. In the Imperial Valley 1,508 palms were inspected in the area surrounding the last heavy infestation. No scale was found. In Yuma, Ariz., 955 inspections of palms were made during the month. This area also is being covered carefully and all necessary pruning, leaf-base work, and digging are being done as the work progresses.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Migratory grasshoppers hatching in southern Arizona.--V. L. Wildermuth, Tempe, Ariz., reports as follows: "E. E. Russell of this laboratory took the first newly hatched nymph of Melanoplus mexicanus Sauss. on February 28 at Chandler, Ariz. Only three specimens were taken in a half-hour sweeping on the John Anderson place where M. mexicanus was extremely numerous last year, and only two nymphs were taken on our old experimental farm near the same place. This year's first date of hatching is 3 weeks later than the first hatching noted last year--February 6. On the early date last year many hundreds of nymphs were taken, whereas this year only a few could be found. It is quite likely that eggs will be hatching rapidly this week, as a heavy rain occurred on March 2 and 3."

Western spotted cucumber beetle scarce in western Oregon.--T. R. Chamberlin, Forest Grove, Oreg., reports that *Diabrotica soror* Lec. has been very scarce in the fields during the month. As reported earlier, none was found in the Forest Grove hibernation cache in December. On February 19 a thorough examination was made of the Rickreall, Oreg., cache, where in February 1930 these beetles were congregated in millions, but not a single living beetle was found. Goats are now running in this area and the soil in the seepage spots where the beetles were most concentrated in 1930 is trampled and shows few signs of new growth. The character of the vegetation had changed considerably in appearance since 1930, possibly on account of a series of drier autumns, and these conditions may have been in part responsible for the abandonment of the cache by *D. soror*. In clumps of reeds in this area, only three *Diabrotica* were found and these had been killed by a fungous disease.

Coccinellid species found in valley cache in western Oregon.--Mr. Chamberlin also states that a small hibernation cache of coccinellids was found in clumps of reeds near Rickreall, Oreg. Most of these beetles appeared to be *Hippodamia 5-signata obliqua* Casey (*H. ambigua* auct.) although some were spotted and a few others were typical *H. convergens* Guer. As *H. 5-signata obliqua*, in the past, has been found to enter caches only on high, bald hills, and the Rickreall cache was more typical for *H. convergens*, a study was made of the male genitalia of samples from the Rickreall cache. While the greater number of these beetles resembled *H. 5-signata obliqua* in general appearance, they were in fact *H. convergens*.

Cultures of hyphomycetous fungi retain viability for many months.--According to L. P. Rockwood, Forest Grove, subcultures from old cultures of hyphomycetous forms of entomogenous fungi showed that these old cultures had retained their viability for more than a year in several cases. This was particularly true for cultures on potato. Comparatively recent cultures of some of the same fungi on salmon appeared to have been rendered sterile by a greasy exudate from the culture media. The following are examples of long-continued viability: *Beauveria globulifera* (auct.) potato culture of May 10, 1933, still viable on February 8, 1935; *Spicaria gracilis* Petch potato culture of March 23, 1933, still viable on January 28, 1935; *Spicaria prasina* (Saw.) potato culture of September 1, 1933, still viable on January 28, 1935; *Metarrhizium* n. sp. (drab) potato culture of June 29, 1933, still viable on February 8, 1935.

Sugarcane borer infestation in varieties of cane.--T. E. Holloway and W. E. Haley, of the Houma, La., laboratory, report the following borer infestations as a result of examinations made in Bureau of Plant Industry replicated variety test fields of sugarcane at Houma during the 1934 harvest season.

Variety	Stalks Examined	Stalks Bored	Joints Total examined	Joints Bored
	Number	Percent	Number	Percent
P.O.J. 36 M	1,600	37.3	21,084	4.8
Co. 290	2,780	41.2	38,747	5.9
C.P. 807	2,800	49.4	45,440	6.1
C.P. 28-19	1,560	51.4	22,552	6.9
Co. 281	2,920	43.8	34,679	7.1
C.P. 28-11	480	59.1	6,500	10.3
P.O.J. 234	1,720	62.9	23,165	11.9
C.P. 29-320	120	81.6	1,773	13.6
C. P. 29-291	120	86.6	1,791	16.1
P.O.J. 213	1,600	78.1	20,447	20.6
D. 95	80	93.7	1,177	22.7
Total	15,780	Av. 51.36	217,355	Av. 8.5

JAPANESE AND ASIATIC BEETLE INVESTIGATIONS

Decomposition of derris.--Experiments conducted by L. D. Goodhue, Moorestown, N. J., showed that derris exposed for 96 hours at a distance of 12 inches from a 300-watt clear glass mazda light did not decompose enough to be detected. However, where derris is exposed to a quartz mercury vapor arc the rate of decomposition is very rapid at first, but finally decreases until a point is reached where the material decomposes very slowly. At 104° F. (40° C.) the rate of decomposition is about twice as fast as it is at 68° F. (20° C.). Mixtures of derris with 15 percent lampblack and with 15 percent titanium dioxide were exposed at the same time to this light and the quantity remaining was determined at intervals by the colorimetric test of Gross and Smith. Lampblack gives more protection than does titanium dioxide, as shown below.

Pigment	Derris remaining after exposure of-- 2.0 hours	6.5 hours	12.0 hours	24.0 hours
	Percent	Percent	Percent	Percent
Lampblack	70	60	60	50
Titanium dioxide	50	45	40	30

Mixtures of derris with 15 percent of the following pigments were exposed to 45 hours of sunlight when snow covered the ground. The temperature was below 32° F.

Pigment	Derris remaining
	Percent
None	12.0
Titanium dioxide	4.0
Aluminum metal	5.5
Lampblack	17.0

Some experiments are in progress using pigments which have been dispersed in blown fish oil before it was emulsified for use as a sticker. By using a colored sticker the derris particles are practically coated with a paint. The results which follow show the lampblack to be of value in preventing the decomposition of derris.

Pigment	Derris remaining after 3 days of sunshine
	Percent
None	17
Titanium dioxide	25
Lampblack	55

Stickers for lime spray.--A report completed in February by J. W. Lipp, Moorestown, on stickers for lime, is summarized as follows: Gum arabic, glue, oleic acid, stearic acid, blown castor oil, peanut oil, olive oil, perilla oil, boiled linseed oil, "summer oil", flour, and aluminium sulphate were tested as stickers for hydrated lime. The best results were obtained with fish oil and with aluminium sulphate.

Attractants for Asiatic garden beetle.--During the month a report by F. W. Metzger, Moorestown, entitled, "Preliminary Tests with Attractants for the Asiatic Garden Beetle", was completed. The report is summarized as follows: The 43 materials tested were vaporized from a bottle by means of a wick, the bait equipment being placed inside the cylinder of a Japanese beetle trap. Unbaited traps were used as checks, as the beetle is apparently attracted to such devices by the white baffle. Rose geranium oil, eugenol, and tansy oil were definitely attractive to the beetle and further tests with these substances appear advisable, especially in connection with light traps.

Method of estimating population of Japanese beetle larvae in the field.--A paper by W. E. Fleming and F. E. Baker, Moorestown, entitled, "A Method for Estimating Populations of Larvae of the Japanese Beetle in the Field", was completed during the month, and is summarized as follows: An investigation was undertaken in 1934 to determine a reliable method for estimating the population of Japanese beetle larvae in the field. The number of larvae in each square foot of four 2,500-square-foot plots was determined and the results were used in estimating the true averages in each plot by different methods. The square-foot unit was found to be the most accurate for estimating the population. As the size of the sampling unit was increased, the error became progressively larger. The size and not the shape of the sampling unit was the modifying factor. The error of the estimate is influenced to some extent by the density of the population. It is possible to estimate a dense population more accurately than a sparse one. It is recommended that in estimating the larval population a minimum number of 25 square-foot units uniformly distributed constitute a sample from plots containing less than 2,500 square feet, and in larger areas the units be spaced not more than 10 feet apart. It is suggested that the larval population can be estimated most accurately with a minimum of labor in large areas covering several acres by estimating the number of larvae in 2,500 square-foot plots in representative portions. By proper sampling it is possible to obtain a very reliable estimate of the larval population in a given area.

JAPANESE BEETLE CONTROL

Nurseries resume shipments.--With generally favorable weather prevailing, activities in nurseries and greenhouses in the southern part of the Japanese beetle area were resumed in February. Over 200,000 plants were certified in New Jersey for shipment to nonregulated points. This exceeds the approximately 100,000 certified in February 1934 and 72,000 in January of this year. Dahlia growers moved large quantities of certified tubers and clumps. Toward the end of the month, quantities of rooted dahlia cuttings were presented for certification.

Azalea fumigation experiments.--Experiments conducted in cooperation with the Japanese beetle research laboratory to develop a method of ridding potted azaleas of Japanese beetle infestation by fumigation with paradichlorobenzene have met with a very favorable response from a number of large azalea growers in New Jersey. Preliminary results indicate that the hardy varieties of azaleas come through the treatment satisfactorily, although the treatment is not entirely satisfactory for the tender varieties.

Adult Japanese beetles appear in greenhouses.--Adult Japanese beetles began to appear in fair numbers in the heavily infested greenhouses of several rose growers in the suburbs of Philadelphia. Numerous reports also were received of one or two adults emerging from potted plants in private residences.

Gypsy moth scouting reveals egg clusters in lightly infested Maine area.--Scouting was completed late in February of the towns of Benton and Clinton, in the lightly infested gypsy moth area and adjacent to the generally infested area of Maine. Twenty-four man-hours scouting in each town resulted in the collection of 848 egg clusters in Benton and 166 in Clinton. The work was performed by the district inspector stationed at Bangor. Owing to the heavy snow the inspector was obliged to do his scouting on snowshoes.

Eradication crews recruited to full strength.--By the middle of February organization of the Dutch elm disease eradication work in New Jersey, New York, and Connecticut had reached its maximum. P. W. A. eradication crews in the field at the end of the month numbered 55 in New Jersey, 50 in New York, and 30 in Connecticut. Assisting in the work were 8 C. C. C. crews in New Jersey and 20 crews supplied from C. C. C. camps in New York. This C. C. C. personnel totaled 439 men. Employed in P. W. A. eradication crews were 1,085 per-diem men and 64 appointed personnel. By the end of the month confirmed Graphium-diseased trees still standing had been reduced to 112, all in New Jersey. Dead and dying trees removed as a part of the winter's elm sanitation campaign totaled 98,588 on February 28. Continued scouting for dead and dying elms brought the total of this type of tree still standing to 239,941. Late in the month, rising water in swamp areas where concentrated elm populations were being rid of dead and dying specimens by C. C. C. crews necessitated emergency changes in work locations.

FOREST INSECT INVESTIGATIONS

Correlation proportion of favored food plants and gypsy moth infestation.--W. L. Baker, of the Melrose Highlands, Mass., field laboratory, submits the following regarding a study he has made of the correlation between proportion of favored food plants and intensity of gypsy moth infestation, based on observations made in New England during the period from 1912 to 1922 in 104 1/5-acre sample woodland plots. Each plot was visited once in the summer and once in the autumn. During the summer visit records of defoliation, tree by tree, were obtained and the tree losses were recorded. During the fall visit the number of egg clusters per acre was determined for each point. Because of tree loss during the decade the proportions of food plants in mixed stands were constantly changing. The records for each point have therefore been gone over and the proportion of favored food plants for each point tabulated year by year. The data have been arranged in a scale of ascending percentages of favored food plants.

Trees in favored food class	Average egg clusters per acre	Average defoliation of all trees
Percent	Number	Percent
0	1,522	8.0
0-10	1,787	6.8
10-20	1,955	9.7
20-30	2,957	13.4
30-40	3,639	16.3
40-50	3,906	18.0
50-60	3,361	15.5
60-70	3,659	27.9
70-80	4,132	27.2
80-90	7,914	32.4
90-100	3,954	32.2
100	9,901	32.5

The data in the above table show a very decided correlation between increase in percentage of favored food in the stand and increase in intensity of population.

New set-up in Dutch elm disease work at Morristown.--C. W. Collins, of the Melrose Highlands, Mass., field laboratory, spent several days in February at Morristown, N. J., in connection with the selection of a building to be used cooperatively by this Bureau and the Bureau of Plant Industry as headquarters for studies relating to the Dutch elm disease. A large residence with accompanying grounds at 8 Whippany Road, and greenhouse space on another property were leased for laboratory and office purposes. After the building has been put in readiness for occupancy and laboratory and office equipment placed, the members of the two Bureaus now stationed elsewhere at Morristown, and part of the present staff of the Melrose Highlands field laboratory, will move to the new headquarters, where members of the Bureau of Entomology and Plant Quarantine will continue work already in progress on insect transmission of the disease. Workers assigned to the new headquarters will be located there on or before April 15.

History of bark-beetle infestation shows value of control.--W. D. Bedard, of the Coeur d'Alene, Idaho, laboratory, reports on the history of a bark-beetle infestation in western white pine which illustrates the value of control work against the mountain pine beetle. The Canyon Creek drainage in the Blackfeet National Forest comprised approximately 6,300 acres of fine, accessible white pine timber, originally estimated at 34,500,000 b.f. In 1928 an infestation of the mountain pine beetle, which up to this time has been in a normal status in the area, suddenly increased. A survey placed the number of infested trees between 1,000 and 1,500. In 1929 the infestation increased to 6,100 trees. The next 2 years showed little change in the situation and it was not until 1932 that a decided decrease was recorded. A survey during the summer of 1934 showed that only a small spot of infestation remained of this once virulent epidemic. Although the infestation has had a natural decrease to normal conditions, it has destroyed approximately 70 percent, or 24,150,000 b.f., of the white pine in the area. Computing this on the basis of the minimum $4 stumpage for white pine, the total loss was $96,600. Had control been instituted in 1928 with maintenance control in 1929, approximately $80,000 of this loss would have been prevented.

Douglas fir beetle control.--In a recent report J. C. Evenden, Coeur d'Alene, summarizes the results of 4 years of control work against an outbreak of the Douglas fir beetle in the Cody Canyon of the Shoshone National Forest and attempts a prediction as to the future of the project. This operation was instituted in the fall of 1931 in Douglas fir stands severely weakened through previous defoliation by the spruce budworm. As a result of this operation, the infestation on the areas covered by control has been reduced from 12,038 trees treated in 1931 to 2,096 trees treated in 1934. No timber loss has occurred within the areas for which protection was especially desired. As the spruce budworm defoliated a much larger area than it was economically possible to cover by bark-beetle control, a considerable number of bark beetle infestations were left untreated. These untreated infestations have resulted in an annual reinfestation of the treated areas, requiring yearly maintenance control.

White-grub studies in forest nurseries.--Recently B. H. Wilford and H. R. Johnston, of the Asheville, N. C., laboratory, completed arrangements with State Forester H. A. Smith, of the South Carolina State Forestry Commission, to expand the white-grub investigations started last season in the nursery located at Georgetown, S. C. A section of the new nursery has been assigned to the Bureau to facilitate the life history and control studies now under way. The problem is an important one in the region, inasmuch as the life cycles are quite short and the beetles are in flight from March to August. Up to the present time most of the damage has been caused by only one or two of the many species which have been taken.

Inspection of C. C. C. projects in the Southeast.--B. H. Wilford and C. B. Eaton have just returned to Asheville after inspecting State and Federal C. C. C. camps in the Southeast to determine the relative importance of insects in slash in improved stands and along highways and trails, where cuttings in pine have been made. The data obtained substantiate previous findings that continuous cuttings can be made throughout the year with little danger of loss of timber from attacks of bark beetles. Here and there a few trees have been killed along highways and trails where the cutting was of short duration, but no significant injury was found in stands that had been improved by thinnings. It is expected that such work can be continued safely unless drought prevails.

GYPSY AND BROWN-TAIL MOTH CONTROL

Rope climbing facilitates gypsy moth control.--Since early in November, when the first training in the use of ropes for climbing was started, nearly all the members of the regular field force have been given instructions in handling ropes, and gypsy moth crews at 13 of the 18 C. C. C. camps engaged in moth work have also been given instructions. With the use of irons the distances men could go into the trees was limited by the size of the branches. After men become skilled in the use of ropes they can reach practically all parts of the trees readily and with safety.

Scouting in New England and Pennsylvania.--Scouting by members of the regular field force was performed in a number of barrier-zone towns in extreme southwestern Massachusetts and in northwestern Connecticut. In the former State some of this work was performed in areas that had not been examined for years. About 4,700 acres of woodland were scouted without finding any infestations. In the Connecticut area a considerable number of woodland acres were scouted, some small new infestations found, and additional egg clusters destroyed at infestations located previously. In certain sections there was a heavy accumulation of ice on the tree branches. A rapid rise in temperature caused the ice to loosen and fall in large pieces. In some localities this falling ice carried with it fragments of egg clusters, which, when carried to the ground, would be difficult to find. In the Pennsylvania infested area considerable scouting was performed in territory close to the spots where assembling cages attracted male gypsy moths during the summer of 1934, and some scouting was also done in areas found infested in past years. About 5,500 acres of woodland were scouted. In the course of this work and while the rough creosoting was being performed by a number of men in the more heavily infested parts of the area, about 6,700 gypsy moth egg clusters were destroyed.

Special survey continued.--The special survey work being performed by experienced Federal gypsy moth employees, in cooperation with the inspection forces of the different States, has been continued with satisfactory progress in the States of New York, New Jersey, and Pennsylvania. Federal employees have confined their work entirely to adjoining portions of the three States, endeavoring to survey as large a territory as possible before discontinuing the work this spring. Up to the end of February 52 townships and boroughs in New Jersey, 42 in New York, and 14 in Pennsylvania had been completed. Special survey report forms received from Ohio indicate that State inspectors have done a limited amount of this kind of work in that State, and the same is true concerning the State inspection force in Pennsylvania. No indications of gypsy moth infestations have been found in any of the States.

C. C. C. work in New England.--The gypsy moth work in 18 camps in New England, which is supplementing barrier-zone work, and being done east of the barrier zone, has continued throughout the month (February). During some of this period over 650 men have been used and much work has been accomplished. Since the first of July over 185,680 acres of woodland and open country have been examined; over 414,000 individual trees along roadsides, in pastures, and around buildings have been examined; 621 acres of woodland have been cleaned. Since the first of July 381,985 egg clusters have been creosoted as follows: 237,628 in Massachusetts; 76,626 in Connecticut; and 67,491 in Vermont.

PLANT DISEASE CONTROL

Informational work on barberry eradication in Iowa.--The informational work conducted in connection with the barberry-eradication program in Iowa during the past 3 years has proved an effective means of determining the nature and extent of the stem rust control problem in individual counties. The value of the work is twofold; first, it brings about an immediate reporting of properties or areas infested with barberry bushes; and second, it serves to build up a permanent cooperating personnel. The Iowa educational system has accepted the study of the stem rust of cereal crops on the basis of its supplementary value to courses offered in agriculture, nature study, and citizenship. In addition to the illustrated talks given by agents of the Bureau, materials are left with the teachers which will enable them to carry on the study of this disease during following years. The accompanying table shows by counties the number of properties infested with barberry bushes that have been reported or located as a result of the educational work during the last 3 years. Generally speaking, Iowa rural schools are not more than about 2 miles apart, therefore reports from an interested group of school children often give a fairly accurate indication of the eradication work necessary.

County	Properties	Bushes	County	Properties	Bushes
	Number	Number		Number	Number
Adams	9	40	Johnson	52	618
Allamakee	50	1,253	Linn	78	9,127
Audubon	4	21	Louisa	9	52
Benton	34	725	Mahaska	5	24
Boone	50	1,626	Polk	28	16,904
Cass	4	15	Poweshiek	27	89
Cerro Gordo	16	0	Scott	46	2,271
Clayton	20	942	Tama	24	375
Clinton	106	11,563	Wapello	4	15
Dallas	47	1,036	Warren	4	8
Dubuque	180	21,143	Winneshiek	116	4,751
Fayette	36	1,260	Worth	27	0
Franklin	3	0	Wright	4	0
Guthrie	54	1,415	Other	39	990
Hamilton	3	0	Total	1,083	76,265
Iowa	1	0			
Jasper	3	2			

The value of this type of work cannot be measured entirely by the number of infestations reported. Pupils learning about the work at school talk about it at home, causing the parents to become interested when other methods have failed. O. R. Shepherd, agent in charge of barberry eradication in Iowa, estimates that 70 percent of the barberry-infested properties reported by children in Iowa have been found through the help of their parents. He also reports that the crew work progresses much more smoothly in counties where extensive educational work has been done.

Ribes-eradication program effective in controlling blister rust.--Field surveys during the past season show that the *Ribes*-eradication program is effective in controlling white pine blister rust in the Inland Empire. Data were taken in five areas where initial *Ribes* eradication was performed in 1931 or before, and for comparison on four check areas where control work had not yet been undertaken. On the five areas where control work had been performed, 967, or 12.6 percent, of the 7,701 pines examined were infected prior to control, while only 46 trees, or 0.6 percent have become infected since, although the necessary follow-up operations had not been completed. On the four check areas 32 of the 1,135 pines examined, or 2.8 percent, were infected prior to 1930. An additional 318 trees were infected from 1930 to 1932, making a total of 30.8 percent of the pines infected, an increase of 28 percent. The increase of 28 percent of the pines infected is to be contrasted with the 0.6 percent of trees infected following *Ribes* eradication. This comparison is conservative in view of the fact that in the areas on which control work was performed, 12.6 percent of the pines were infected prior to control work, whereas in the check areas the infection started with only 2.8 percent of the trees infected at the time when _Ribes_-eradication work was performed on the control areas.

Western North Carolina appreciates its white pine.--A large number of residents in the Piedmont and mountain sections of North Carolina cooperated with the State and Federal Departments of Agriculture during the past year in the protection of the white pine from blister rust. White pine has been planted extensively in Asheville, Biltmore, Hendersonville, Flat Rock, Blowing Rock, Lenoir, and other places in the western part of the State, and is considered a decided asset to these communities. Native white pines are also numerous in some of these cities. When the property owners in these cities were told about the blister rust disease, 73 percent of them voluntarily gave up their cultivated currants and gooseberries to safeguard the pines, although the rust had not yet reached the State. Records of 762 owners having cultivated currant and gooseberry plants show that 556 cooperated in the removal of 85,230 cultivated bushes during the past year. This timely and effective cooperation resulted from personal contact and informational work among property owners, rather than from the enforcement of the State blister rust control law.

White pine shelterbelts in Iowa protected from blister rust.--During 1934 a substantial beginning was made in the protection of white pine shelter-belts in Iowa against blister rust. White pine is used extensively in the State as a shelterbelt tree, particularly in the northern half. It is considered the best all-round evergreen tree in the State and a three-purpose tree, serving equally well for beautifying the home grounds, as an effective shelterbelt tree, and as one of our fastest growing trees for timber production. In general, planted white pine makes excellent growth in the State, is a long-lived tree, and has a comparatively low mortality rate. On the basis of available preeradication-survey data, it is estimated that there are 55,000 coniferous shelterbelts in Iowa, of which approximately 7,500 are classified as white pine belts. During the past field season a total of 970 white pine shelterbelts in seven counties were listed for protection. Of this total, 776, or 80 percent, were given protection with the cooperation of the owners; 123, or approximately 12.7 percent, of the owners did not desire their shelterbelts to be protected, or valued their _Ribes_ more; and 71, or 7.3 percent, of the shelterbelts were not considered worth the expense of protection. To protect the 776 shelterbelts it was necessary to examine 62,158 acres of land from which 211,448 wild _Ribes_ and 11,053 cultivated _Ribes_ were removed at a total cost of 454 man-days of labor. On the average, for each shelterbelt protected it was necessary to examine approximately 80 acres of ground and to pull 273 wild and 14 cultivated _Ribes_, at a cost of 0.58 man-day per shelterbelt. It is hoped that the remaining white pine shelterbelts in the State can be protected from blister rust before the disease becomes well established and causes serious damage.

COTTON INSECT INVESTIGATIONS

Parasites of the boll weevil in the Carolinas.--C. F. Rainwater, Florence, S. C., reports that in 26,923 weevil-infested cotton squares collected in 14 counties of eastern South Carolina during the summer of 1934, the following species of parasites were recorded: *Microbracon mellitor* Say, 730; *Eurytoma tylodermatis* Ashm., 33; *Zatropis incertus* Ashm., 13; *Catolaccus hunteri* Cwfd., 8; *Microbracon* n. sp., 8; *Triaspis curculionis* (Fitch), 4; *Rhoptrocentrus piceus* Marsh., 1; *Catolaccus kansensis* Gir., 1; *Microdontomerus anthonomi* Cwfd., 1; *Telenomus* sp., 1; and *Gonatocerus novifasciatus* Gir., 1. From 559 boll weevil-infested squares collected in September in three counties in southeastern North Carolina 15 *M. mellitor* were reared. As no egg parasites have been recorded from the boll weevil, *Telenomus* sp. and *G. novifasciatus* should not be so considered unless additional evidence is obtained to definitely associate them with the boll weevil. *R. piceus* and *C. kansensis* also should not be considered as boll weevil parasites without additional evidence.

Relation of pink bollworm damage to age of bolls attacked.--C. S. Rude and S. L. Calhoun, Tlahualilo, Durango, Mexico, report on studies on the nature of the damage caused by the pink bollworm and the age at which bolls become infested. During the period June 4 to October 12, 118,357 blooms were tagged, 67.6 percent of which were shed. No damage by pink bollworms was found in bolls that opened on or before August 21, or those that opened within approximately 1 month after the first infestation in green bolls was found. Bolls opening from September 19 to 25 were 53 percent infested, causing a loss of 4.47 percent in weight of cotton; bolls opening September 26 to October 2 were 77.4 percent infested, with a loss in weight of 24.55 percent, which later increased to 40.84 percent. The green boll examinations showed that a boll infestation of 10 to 20 percent, with an average of 0.15 to 0.4 larvae per boll, would result in considerable loss in weight of cotton and some "dead" locks, and that a 70-percent boll infestation with an average of 1.47 larvae per boll resulted in 7.25 percent "dead" locks. The grade of the lint was lowered one grade in slightly injured bolls and 3½ grades in badly injured locks. Likewise, the oil content of the seed was reduced from above 20 percent in noninfested seed to 17.8 percent in samples with 25-percent infested seed; to 14.6 percent in 50-percent infested seed; and to 7 percent in seed 95-percent infested.

Hemipterous insects on cotton in Arizona.--T. P. Cassidy and T. C. Barber have reported on their last season's work at Tucson and Buckeye, Ariz., on the species of hemipterous insects causing injury to cotton in that State. It was found from cage tests that *Euschistus impictiventris* Stal., *Chlorochroa* sp. (*sayi* Stal. or *uhleri* Stal.), and *Dysdercus mimulus* Hussey are largely responsible for the staining and lowering of grades of cotton in Arizona in recent years. Bolls of long staple of Pima cotton attacked by *Euschistus impictiventris* become hard and mummified and are practically ruined. The damage to short staple by this species is not so severe and, although the lint is stained, much of it is still pickable. With *Chlorochroa* sp. the damage is greater in short staple than in Pima cotton. The injury caused by *Dysdercus* *mimulus* is about the same to both long and short staple and is usually confined to one or two locks per boll. Because of their greater abundance, *E. impictiventris* and *D. mimulus* were responsible for most of the commercial losses last season, but *Chlorochroa* sp. would cause at least as much loss if it were as abundant. All of the species named have other host plants and there was little breeding on cotton. *Dysdercus* was able to maintain itself on cotton better than were the other species. A species of *Lygus* was abundant in the fields and, although this species fed on the bolls in cages, the feeding punctures were confined largely to the hulls of the bolls, causing no staining and little damage. It is suspected, however, that they cause shedding of the squares. The alfalfa leaf hopper (*Stictocephala festina* Say) was also very abundant on cotton but caused no damage to bolls. Neither *Lygus* nor *Stictocephala* bred in the cages. In the cages with *Euschistus*, *Chlorochroa*, and *Dysdercus* the bolls were set much later in the season and largely after the insects had become less active, as the nights became cooler in September and October. A survey of the damage in the five counties comprising the main cotton sections of Arizona was made during October. No attempt was made to differentiate the injury caused by the different Heteroptera. The percentage of punctured bolls ranged from 5 percent in Pima County to 58 percent in Yuma County, averaging 23.4 percent for the State. Cotton growers say that the damage is increasing year by year.

Insecticidal tests against Hemiptera on cotton.--Several insecticides were tested against Hemiptera in cages and in the field at Buckeye, Ariz. In the cage tests nine insecticides were used against *Lygus* sp., *Euschistus impictiventris*, *Chlorochroa* sp., and *Dysdercus mimulus*. The average percentages of control obtained for the four insects were as follows: Pyrethrum, 54.4; cube root, 34.5; sodium fluosilicate, 42.1; derris (4 percent rotenone), 37.2; lead arsenate, 25.8; flotation sulphur blend, 19.2; ground sulphur, 19.8; flotation sulphur, 15.9; and phenothiazine, 9.8. Results of the field-plat tests are shown in the following table.

Treatment	Location: Plat	Location: Field	Applications	Quantity applied per acre	Yield of seed cotton per acre	Increase in yield of seed cotton	
			Number	Pounds	Pounds	Pounds	Percent
Sulphur	1	A	6	32	1,323	189	16.7
Check	2	A	--	--	1,134	--	--
Derris (4% rotenone)	3	A	6	27.5	1,285	151	13.3
Pyrethrum (Activated A dust)	4	A	6	25.5	1,436	328	29.5
Check	5	A	--	--	1,108	--	--
Sodium fluosilicate	6	A	6	40	1,625	517	46.6
Lead arsenate	1	B	4	15.5	2,217	453	25.7
Check	2	B	--	--	1,764	--	--

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Pink bollworm work in Florida.--Throughout February excellent progress was made in recleaning wild cotton areas in southern Florida. The Key West district was completed, with the exception of one or two small colonies, and the Key Vaca group was also completed. Because of unfavorable tides and low water, the Florida Bay section has been left somewhat spotted; however, the remaining areas can be easily worked as soon as conditions are favorable. The recleaning of Cape Sable was completed, with the exception of one small section. The Everglades section of Monroe County has also been completed. Most of the area remaining to be recleaned is in Collier County, from Naples southward. During the month approximately 1,943 acres were cleaned, from which 1,445 mature, 285,278 seedling, and 14,850 sprout plants were removed. Six hundred and ninety-two acres of virgin territory have been cleaned, 55,846 mature and 52,507 seedling plants having been removed. During the above clean-up 2,546 wild cotton bolls were inspected. On Bamboo Key, in the Key Vaca group, four pink bollworm larvae were found. Infestation was found on Cape Sable and, although no exact counts were made, the infestation was estimated at approximately 50 percent. This was in virgin cotton, located on the extreme east end of the cape. The areas covered are being thoroughly inspected to see that no plants are overlooked. During the month, 67 man-days of scouting resulted in the finding of several small colonies on the Key Vaca group and 14 scattered plants in Manatee County.

No pink bollworm found in Alabama.--At one of the Florida stations considerable material has been inspected from Houston County, Ala., immediately adjacent to one of the infested counties in Florida. A considerable quantity of cotton from this county was ginned in Florida last season and the negative results are especially gratifying.

Thurberia weevil in Arizona.--Through laboratory inspection of material collected, a light infestation of the Thurberia weevil has been discovered at Midvale, about 4½ miles southwest of Tucson, and another on the University of Arizona Experiment Farms, about 3 miles northwest of Tucson. These evidently did not occur until late in the season and would not have been found by gin-trash inspection. This makes four sections in which light infestations have been discovered in the 1934 crop. Laboratory inspections are being continued at San Antonio and also at a number of field stations, all results having been negative to date.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Outbreak of beet leafhopper in southern Idaho predicted.--According to a report submitted by J. R. Douglass, of the Twin Falls, Idaho, laboratory, conditions up to the end of February presage high spring and summer populations of the beet leafhopper in Twin Falls, Jerome, Minidoka, and Cassia Counties. The high spring population of 1934 was somewhat reduced by the abnormally dry summer weather. This reduction was partially offset, however, by an increase of summer host plants (Russian-thistle) on lands temporarily abandoned because of water shortage. As a result, fall populations were about normal and fall and winter host plants were sufficiently abundant to enable the beet leafhopper to enter the winter under favorable conditions. The winter has in general been favorable for survival, being comparable to that of 1930-31, which was followed by high leafhopper populations. Although a late spring could delay the migration into beet fields, high populations may be expected in beet-growing areas close to leafhopper breeding grounds.

Effectiveness of pyrethrum against celery leaf tier.--C. B. Wisecup and J. P. Vinzant, of the Sanford, Fla., laboratory, report that pyrethrum proved to be more effective for the control of the larvae of the celery leaf tier (Phlyctaenia rubigalis Guen.) than lead arsenate, synthetic cryolite, or derris. Newly hatched, quarter-grown, half-grown, and nearly mature larvae were used in the tests, but pyrethrum was not tested against the newly hatched larvae, because preliminary trials had shown conclusively that exceedingly dilute pyrethrum dusts were 100 percent lethal to such larvae. The dusts were applied to the leaves of the food plants with a precision apparatus. Pyrethrum containing 0.9 percent total pyrethrins was used undiluted and also diluted with 2, 4, and 8 parts of clay. Lead arsenate, cryolite, and derris-root powder were diluted with approximately 3, 10, 25, and 75 parts of clay. The derris-powder mixtures contained approximately 3.0, 1.0, 0.5, and 0.1 percent rotenone. Pyrethrum was found to be the most toxic material tested against all stages of the larvae and gave a satisfactory percentage of kill at all strengths tested. Cryolite was fairly effective at strengths of 1 to 3, and 1 to 10 against newly hatched larvae, and at a strength of 1 to 3 against the quarter-grown, half-grown, and nearly mature larvae, but the use of this material involved the hazard of a harmful residue on the market product. Lead arsenate at a strength of 1 to 3 was effective against the newly hatched and quarter-grown larvae, but was not effective against the half-grown or nearly mature larvae at any strength tested. Derris was the least effective of any material tested, no dilutions of this insecticide being satisfactory against larvae of any size. Tests are being continued with equal parts of pure pyrethrum powder and its diluent, the formula now recommended for leaf tier control.

Pea weevil infestation low in Palouse district.--T. A. Brindley, of the Moscow, Idaho, laboratory, reports that the average percentage of peas infested by the pea weevil in the Palouse district in northern Idaho and eastern Washington in 1934, as determined from an examination of 1,330 samples containing 85,183,400 pounds of seed peas, by the pea-grading service of the Bureau of Agricultural Economics, was approximately 3.95 percent. The data were obtained by examining 250-gram samples taken from every fifth bag of peas after they were delivered to the warehouse. During the 11-year period from 1923 to 1933, inclusive, the annual average percentage of infested peas in this section ranged from 20.0 to 3.2 percent, averaging for the period approximately 10 percent.

Salt-flotation effective in separating weevil-infested seed peas.--Mr. Brindley also reports that solutions of calcium chloride proved very effective in separating weevil-infested peas from noninfested peas by the flotation method. The best results were obtained with a solution having a specific gravity of 1.28. The efficiency of the separation was increased as the weevils increased in size, suggesting that separation could be accomplished more efficiently in commercial establishments if fumigation of the seed and separation of the infested peas by the salt-flotation method were delayed until most of the weevils had reached the pupal or adult stage. Although in the solutions of higher density a few of the noninfested peas floated off with the infested peas, this loss would be more than offset by the decrease in weevilly peas in the manufactured product. These results were more satisfactory than previous results obtained with sodium chloride.

Lima bean pod borer damages lima beans in California.--Rodney Cecil, of the Ventura, Calif., laboratory, reports that a survey was recently completed in nine warehouses at Ventura receiving lima beans from the 1934 crop. A total of 640,420 sacks, each containing 100 pounds of beans, were received at these warehouses. It is estimated that the loss incurred by the feeding of the pod borer on these beans, plus the cost of removing the damaged beans by machinery and by hand-picking, amounted to approximately $154,000. In general, beans that were grown in the small canyons and valleys near the wild host plants were more heavily damaged than beans grown in wide valleys and at greater distances from the wild host plants. The late-maturing beans were damaged more than the early ones.

Dust mixtures of derris and cube are equally effective against striped flea beetle, tests indicate.--Norman Allen, of the Baton Rouge, La., laboratory, reports that in preliminary tests dust mixtures composed of derris root and cube root, with finely ground tobacco dust and 300-mesh dusting sulphur as diluents, proved equally effective in controlling the adults of the striped flea beetle attacking young turnip plants. Each of these dust mixtures contained approximately 1 percent rotenone, diluted with equal parts of tobacco dust and sulphur. The dusts were applied with a rotary hand duster to dry plants in the afternoon, when the temperature was approximately 53° F. and the relative humidity approximately 55 percent. Examinations made from 22 to 24 hours after the applications revealed that the derris-dust mixture caused a mortality of 98.34 percent of the beetles and the cube-root-dust mixture a mortality of 98.43 percent. The cost of the cube-root mixture was approximately two-thirds that of the derris-root mixture.

Sulphur dust [illegible] effective against eggs of Mexican mealybug.--H. H. Richardson, of the greenhouse-insects laboratory, Washington, D. C., in his studies of *Phenacoccus gossypii* T. and Ckll., has found that sulphur dust will kill a considerable percentage of the eggs. Two kinds of sulphur dusts were used: 300-mesh dusting sulphur, and a relatively new product of bentonite and sulphur. There was little difference in the efficiency of the two materials.

Low temperatures lethal to Mexican mealybug eggs.--Mr. Richardson has also found that the eggs are much more sensitive to temperatures of 40° F.

and below than are the older stages. After three successive nights with minimum temperatures ranging from 35° to 36° early in October, almost complete kill of eggs was obtained, whereas just before this only 3.9 percent of the eggs were dead. After a temperature of 19° on December 10, practically complete kill was noted and on February 8 after a month of low temperatures the kill was 100 percent. The older stages have been much more resistant than the eggs, and even after the low of 19° on December 10, the mortality was only 19.9 percent. However, after the extreme weather of January, with a minimum of -2°, the kill was 100 percent. The adults, pupae, and third-stage nymphs were much more susceptible to cold than were the first-stage and second-stage nymphs.

INSECTS AFFECTING MAN AND ANIMALS

Winter activities of screw worm flies.--Reports received from W. V. King, Orlando, Fla., state that screw worm cases have been quite numerous in that State but activities were checked by cold weather the last of the month. W. E. Dove, Savannah, Ga., reports infestations in several counties in southern Georgia and along the Alabama line during the winter. C. Lyle, Chief Entomologist, Mississippi State College and Agricultural Experiment Station, State College, Miss., says that infestations have been reported throughout the winter. The unusually severe weather in that section apparently has not stopped the activity of the flies. At Uvalde, Tex., a few cases of screw worms have been reported by ranchmen, but not so many in February as in January.

Hibernation of screw worms.--Studies on the hibernation of *Cochliomyia americana* Cushing and Patton, the primary screw worm, conducted at Dallas, Tex., by Roy Melvin, show that pupae placed in moist sand and exposed to outside temperatures in an open insectary on November 24, 1934, produced adult flies 54 days later when exposed to a temperature of 86° F. Mr. Melvin also reports that larvae of this species penetrated wet clay soil to a depth of 17 inches, and that the weighted mean depth of penetration in this type of soil was 7.77 inches. The weighted mean depth of penetration by *C. macellaria* Fab. in this same medium was only 1.35 inches. Hibernation studies of *C. americana* carried out at Uvalde, Tex., by R. A. Roberts show that of pupae buried under 4 inches of soil on January 19, approximately 37 percent produced adult flies 41 to 44 days later. The experiments were made under outside conditions. The lowest air temperature recorded for the period was 18° F. and the lowest temperature of the soil surrounding the pupae was 40°.

Eye gnats beginning to emerge.--R. W. Burgess, of the Uvalde laboratory, who has been working with species of *Hippelates*, reports that there has been a slow but continuous emergence during the month in the Winter Haven and Crystal City, Tex., districts. The Coachella Valley in California has also reported an unusually severe outbreak of this pest. Doctors in this region are concerned on account of the danger of an epidemic of eye infection, a disease carried by this insect.

New talkie on mosquitoes released.--L. O. Howard introduces the new sound picture on mosquitoes which has just been released by the Office of Motion Pictures of the Department. The film covers in two short reels the life histories and methods of control of some of the more important species. Much of the film is taken from the silent version, but new pictures, such as that of the great reclamation work on the Pontine marshes near Rome, have been included. The closing feature reproduces the buzzing of a swarm of mosquitoes. The film was shown at the New Jersey Antimosquito Convention and was highly commended.

FOREIGN PLANT QUARANTINES

Recent entomological interceptions of interest.--Twenty-two living larvae of the Mediterranean fruit fly (*Ceratitis capitata* Wied.) were intercepted at New York in four sorbe apples (*Sorbus domestica*) in baggage from the Azores. Quinces in baggage from three countries were found to be infested with the Mediterranean fruit fly in 1933 as follows: Larvae from Portugal intercepted at Providence, R. I., on October 20; larvae from Greece at New York on November 1; and larvae and pupae from Italy at New York on November 9. A living specimen of *Ligyrocoris aurivillianus* Dist. was taken at Nogales, Ariz., on a tomato in cargo from Culiacan, Sinaloa, Mexico. Larvae of the carrot rust fly (*Psila rosae* Fab.) were intercepted at Philadelphia in a celeriac (*Apium graveolens rapaceum*) root in stores from Sweden. This is a European psilid common in eastern and middle North America and also reported from Oregon. A living adult of the scarabaeid *Pleurophorus parvulus* Chev. was found at Mobile, Ala., on a banana stem in cargo from Honduras. Six living larvae of *Psylliodes chrysocephala* L. were intercepted at New York in two radish roots in stores from Denmark. A. G. Böving reports that radish is an unusual host plant for this leaf beetle. The coccid *Tylococcus giffardi* Ehrh. was taken at San Francisco on a seed of *Pandanus* sp. in baggage from Hawaii. A living larva of *Collabismodes cubae* Boh. arrived at New Orleans in a pepper fruit in cargo from Cuba. This weevil has been reported attacking peppers in Dade County, Fla. The scale insect *Furcaspis oceanica* Lindinger was taken January 8, 1934, at Honolulu, Hawaii, on a coconut in the mail from the Marshall Islands, the first record in our files of this coccid being intercepted. Three living larvae of the bean pod borer (*Maruca testulalis* Geyer) arrived at Laredo, Tex., in string-bean pods in cargo from Cuauhtemoc, Tamaulipas, Mexico. This is the first record in our files of this olethreutid being intercepted from Mexico. This insect has been taken on numerous occasions from Cuba, and has also arrived from China, Dutch Guiana, Haiti, Hawaii, Japan, Puerto Rico, and Tahiti. The chrysomelid *Lactica mexicana* Jacoby was intercepted at San Pedro, Calif., with bananas in cargo from Panama. One larva and two pupae of the celery fly (*Acidia heraclei* L.) were found at Philadelphia in the stems and leaves of celery in stores from Italy. This trypetid mines the leaves and stems of celery, parsnip, and other plants in Europe, causing considerable injury.

Correction.--In News Letter for February 1, 1935, (vol. 2, no. 3) the interception of citrus blackfly reported was made in New York, not at Philadelphia as stated.

Recent pathological interceptions of interest.--*Anguillulina pratensis* (de Man) Goffart was intercepted in potatoes from Argentina at New York on February 16 and 17, at New Orleans on February 18, and at Port Arthur, Tex., on February 22. One tuber intercepted at New York was so heavily infested that atrophy was very pronounced. This pest has been intercepted from Argentina once every year since 1931. *Apiospora* sp., similar to *A. striola* (Pass.) Sacc. but with much larger spores, was intercepted on lemon grass from Jamaica on January 21 at New York. *Brachysporium* sp., unlike any species of which descriptions could be found, was intercepted on February 7 at New York in melons from Argentina. Azaleas from Belgium were intercepted at the Washington inspection house on December 14 and found affected with a *Cercospora* which has been tentatively determined as *C. handelii* Bubak by Dr. Charles Chupp, who states that this species and *C. rhododendri* Marchal and Verplanche are variable, very much alike, and may be synonymous. Our second interception of *Cerotelium desmium* (B. & Br.) Arthur was made on February 21 at New Orleans, the host being cotton leaves from Martinique, French West Indies. *Cladosporium aphidis* Thum. was intercepted (first interception) on February 14 at New York on scales on nectarines from Chile. *Gloeosporium piperatum* E. & E. was intercepted (first interception) on December 28, 1934, at New York on hot peppers from Java. *Gonatobotrys flava* Bon. was intercepted (first interception) on *Isaria* sp. larvae in broomcorn from Hungary, on February 7 at New York. *Melanconium sacchari* Massee was intercepted on *Saccharum arundinaceum* for the first time, on material from the Philippines, on January 14 at New York. A well-marked case of mosaic on a green pepper from Cuba was intercepted at New York on February 25, the first interception of the kind on this host. *Mycosphaerella* sp., intercepted at the inspection house in Washington on September 7, 1934, on *Opuntia* (?) sp. from Mexico, is our first interception of this genus on cactus and appears to be a new species. Our second interception of *Peronospora schleideni* was made on February 2 at Baltimore on leeks from Japan. Our first interception of a *Pestalozzia* on *Musa* was made on January 28 at New York on banana leaves from Puerto Rico. Although unlike any species reported on *Musa* it is being carried as *P. guepini* Desm. (pro tem). *Phoma* sp. (? *P. hibiscicola* Gz. Frag.) was intercepted at New Orleans on January 7 on okra from Cuba, our first interception of a *Phoma* on this host. *Phyllosticta globuli* Pass. was intercepted (first interception) on January 31 at Seattle on eucalyptus leaves used as packing around dahlia tubers from Australia. *Thielavia* sp. was intercepted on kudzu root for the first time on January 29 at New York in cargo from China. Our second interception of *Tranzschelia pruni-spinosae* (Pers.) Diet. on peach was made on February 16 at Baltimore on fruit from Ecuador. The previous interception was in 1922 from Chile. Our first interception of *Vermicularia cacti* (S.) Starb. was made on February 18 at New York on *Opuntia* sp. from Puerto Rico.

Pest interceptions increase.--The number of interceptions has shown a marked increase during the past 5 years, from a total of 5,148 for the fiscal year 1930 to 25,305 for 1934. The present fiscal year shows continued increase, the interceptions for the first 8 months (July 1934 to February 1935) totaling more than the entire 12 months of 1934. More pest interceptions were made in February 1935 (4,584) than in January and February

1934 combined (4,476). While much of the increase is due to increased activity at New York, ports in general are maintaining a high average. In keeping with the increase in the volume of interceptions, there has been a marked increase in the number of new or unusual organisms found, as a study of the News Letter notes will show.

Pink bollworm accompanies cottonseed cake.--A shipment of 1,344 bags of cottonseed cake, ground in Japan and entered at New York February 1, was found on inspection to have whole cottonseeds on the outsides of many bags, under the fiber ties, adhering to the fabric, or in the tied top. Altogether about 1 pound of these seeds were present on this shipment and approximately another pound had fallen off and mixed with debris on the wharf. The latter lot was promptly burned with the debris, and the collected lot yielded upon examination 10 live and 4 dead larvae of the pink bollworm. A second lot of 5,000 bags in the same consignment was free from such contamination.

Mediterranean fruit fly found in grapefruit.--Larvae and pupal cases of the Mediterranean fruit fly were intercepted at Philadelphia on February 6 with grapefruit in ship's stores from Haifa, Palestine. This represents the first record in our files of this fruit fly being intercepted from Palestine and also our first record of its being intercepted in grapefruit from any foreign country.

European corn borer found in corn cobs.--A living larva of the European corn borer was found on January 30 in a corn cob arriving in a shipment of 262,991 bushels of shelled corn from Roumania and Yugoslavia on a Greek vessel. The corn was cleaned at the port and several bushels of corn cobs from it were examined. Evidence of corn borer injury was found but only this one larva was discovered. The corn from the two countries was mixed in the hold, and it was not possible to determine the source from which the borer came, although it is known in both countries. There is no previous record of its interception from either country in our files.

Ship's officers cooperate with inspector.--A note from the inspector at Charleston, S. C., says, "I have found that a great percentage of unusual plants and plant products at this port are carried on Japanese ships. In some cases I have been in doubt about the correct scientific or common names of some of the plants or plant products. Usually, one of the officers has a large Japanese-English dictionary, and is able to assist in arriving at the correct name by referring to the Japanese name. Then by referring to Bailey's Encyclopedia, I have been able to find a complete description."

Inspector gets perfect tip.--While waiting for the customs searchers to report from below decks, an inspector assigned to the SS Evangeline, which arrived February 16, 1935, at New York from a West Indies cruise, was examining passengers' quarters on an upper deck. One of the crew came by with a suspicious-looking basket in hand. In passing he turned to another member of the crew and asked, "Are the 'Philistines' still below?" The inspector stepped forward and replied, "Boy, the 'Philistines' are upon you! I'll take those mangoes."

Importer appreciates service.--A letter from an importer says, "I wish to thank you for the courtesy you have shown to me in the past. You have done me many favors which I greatly appreciate. In fact it seems the entire Agricultural Department from Federal to State and county are always ready to meet the public more than half way and always in a very courteous way. Last October when I made a trip to Lower California, I by accident brought back more plants than my permit called for. As I was wondering what plants I would throw away, a special amending permit came along, which allowed me to bring all the plants in. One who has never gone through the hardships of collecting cannot realize what a favor like this means to the importer."

DOMESTIC PLANT QUARANTINES

Transit inspection of spring nursery-stock shipments.--The inspection of mail, express, and freight shipments in transit for compliance with Federal plant quarantine requirements is under way at Atlanta, Boston, Chicago, Cleveland, Detroit, Indianapolis, Jacksonville, Kansas City, New York, Omaha, Philadelphia, Portland, Oreg., St. Paul, Seattle, Spokane, and Washington, D. C. The force of 28 inspectors engaged in the work for the spring nursery-stock shipping season is made possible through the temporary assistance of 9 Federal inspectors assigned from such projects as those relating to white pine blister rust and the European corn borer, and of State inspectors of Florida, Georgia, Illinois, and Missouri. During February, a month when shipping is light, 30,090 shipments were inspected, and 48 apparent infringements of the various quarantine regulations were found.

Citrus trifoliata in Galveston area destroyed.--Inspection activities were carried on extensively in Galveston County, Tex., during February, the area inspected embracing several towns and vicinities along the bay and including three abandoned nurseries containing numerous *Citrus trifoliata*. Owing to the high susceptibility of this species to the citrus canker, these trees are being destroyed with the cooperation and assistance of the owners. During the month, 959 such citrus trees, growing on roadsides, vacant lots, and places remote from roads, as well as in nursery blocks, were destroyed in the course of inspection work. Inspections were also made in Brazoria and Victoria Counties, Tex., without finding the disease.

Citrus canker inspection in other States.--In Mississippi the inspection of 387 properties in four counties in the southern extremity of the State resulted in finding no citrus canker in nursery stock, groves, or abandoned trees. One Federal and one State inspector are engaged in the work on full time, and a second State inspector on part time. In Alabama one inspector, employed on a cooperative basis, has begun the search for any undiscovered incipient infections that may exist in areas formerly known to be infected. Work in Louisiana has been concentrated on the inspection of fruit being shipped from the commercial areas in southern Louisiana, as a ready means of detecting any citrus canker that might exist in the groves. None has thus far been found during the fall and winter inspections.

State action on narcissus inspection.--The revocation of the narcissus bulb quarantine, effective April 1, left the States free to act in placing any restrictions which seemed desirable. Word is received that the State of California will, for the present at least, permit entry of narcissus bulbs subject to destination inspection the same as other plant material; that in Maryland and Pennsylvania the inspection of narcissus plantings will be continued as part of the general nursery-inspection program; and that in Mississippi it is unlikely that any regulation will be placed affecting the movement of narcissus into or within the State. The Central Plant Board discussed the subject briefly at its meeting at Urbana, Ill., on February 27. The committee's recommendation that these States continue for a year the inspection and certification of narcissus bulbs for movement interstate, without special quarantine action, was lost because of a tie vote. While the matter was left in a somewhat uncertain status, it seemed clear that officers of the Central States would not promulgate special quarantines nor make special requirements as to inspection or certification of these bulbs.

CONTROL INVESTIGATIONS

Rapid method for determination of pyrethrin II.--H. L. Haller, of the Insecticide Division, has developed a rapid method for the determination of pyrethrin II, one of the two active insecticidal constituents of pyrethrum flowers. By this method an analysis for pyrethrin II can be completed within 1½ hours, whereas the methods now in use require from 4 to 24 hours. The annual consumption of pyrethrum flowers in the United States for insecticidal purposes is estimated at 10,000,000 pounds.

BEE CULTURE

Are bees poisoned by yellow jessamine?--C. E. Burnside, of the Somerset, Md., laboratory, reports having examined young adult bees from Georgia whose intestinal tracts were well laden with pollen from yellow jessamine. The beekeeper who sent the sample of bees reported that the young bees were dying in excessive numbers. It has frequently been observed in some sections of the South that many young bees die during the time of year when this plant is in bloom, indicating that the pollen or nectar from this plant may be poisonous. The bloom of yellow jessamine is reported to be unusually abundant in Georgia this year.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

A mite on boxwood.--H. E. Ewing reports the third record for the United States of Eutetranychus latus (Can. & Fanz.) in the identification of specimens collected on boxwood at Arlington Farm, Va., on March 6, 1934, by H. H. Richardson.

The host of Helorimorpha.--Among a small number of parasitic Hymenoptera presented by R. H. LePelley, Entomologist of Kenya Colony, for deposit in the national collection, are two specimens of Helorimorpha coffeae Brues reared from adults of the pentatomid Antestia lineaticollis Stal. This record is of unusual interest, as nothing has previously been known concerning the habits and host associations of any member of this widely distributed braconid genus.

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FRUIT INSECT INVESTIGATIONS

Storage at low temperatures prevents insect infestation in shelled pecans.--C. B. Nickels, in charge of the pecan-insect laboratory at Brownwood, Tex., reports observations on the effect of storage at low temperatures on insect infestation. A local pecan dealer had had several shipments of pecan meats returned to him because of insect infestation. As many as 28 adult Indian-meal moths (Plodia interpunctella Hbn.) emerged in a short time from one-fourth pound of shelled nuts. A number of samples were taken from his stock of 35,000 pounds, which had been held in storage at temperatures below 40° F. and were then stored for 30 days in a room at 70°. No insect infestation developed at any time, which indicated that holding the nut meats at low temperatures prevented insect infestation and that the infested samples returned to the dealer had undoubtedly become infested after leaving his plant.

Fumigation with chloropicrin for control of hibernating codling moth larvae.--E. J. Newcomer, in charge of the Yakima, Wash., laboratory, reports that F. P. Dean has made a study of the effect of chloropicrin on overwintering larvae of the codling moth. Larvae that had cocooned in 2-inch corrugated bands were placed in friction-top cans in a constant-temperature box. As soon as the temperature in the cans was equalized, chloropicrin was introduced and the cans were held at a constant temperature for definite periods. After exposure, the larvae were kept at room temperatures for at least a week before being examined for mortality. The following table gives the results obtained:

Temperature	Gas concentration per 1,000 cu. ft.	Time of exposure	Larvae used	Mortality
°F.	Pounds	Hours	Number	Percent
35.7 (av.) [1]	½	24	47	57.4
35.7	1	do.	89	87.6
50	1	do.	26	100.0
50	1½	do.	94	93.6
60	1	do.	44	100.0
60	2	do.	188	100.0
70	½	8	177	24.9
70	1	do.	61	60.7
70	¼	24	90	50.0
70	½	do.	124	28.2
70	1	do.	177	100.0
70	2	do.	78	100.0
80	1	do.	64	100.0
80	2	do.	157	100.0
Check	--	--	125	0.

[1] Constant temperature not used. Actual temperature ranged from 28° to 42° F.

It seems apparent that in a practically airtight container, 1 pound to 1,000 cubic feet is sufficient for a 24-hour exposure at any temperatures above 50°F.

Emulsions of ethylene dichloride effective against peach borer larvae in dug nursery stock.--O. I. Snapp and J. R. Thomson, Jr., of the Fort Valley, Ga., laboratory, have just reported experiments which show that a 5-percent emulsion of ethylene dichloride sprayed on the soil over dug nursery stock, heeled in in an upright position, at the rate of 1 quart to each bundle of 15 trees, will eliminate practically all larvae of the peach borer (Aegeria exitiosa Say) without injuring the trees. Much better results were obtained when the trees were in an upright position than when heeled in at an angle of 45°, apparently because of the fact that the gas has to travel a greater distance before reaching the trees at the bottom of a bundle when they are in a slanting position. Ten-percent emulsions of ethylene dichloride caused considerable injury to some of the trees.

Grape pomace as a trap for grape leaf hoppers.--G. A. Runner, in charge of the grape-insect laboratory at Sandusky, Ohio, reports that on numerous occasions it has been noticed that grape leaf hoppers are attracted in immense numbers and frequently from considerable distances to pomace heaps located near vineyards. Last October a large quantity of grape pomace from a wine press was hauled to a weedy place bordering a vineyard. Large numbers of three-banded leaf hoppers (Erythroneura tricincta Fitch) were soon attracted to the locality and were still very abundant during the latter part of March. Although about one-half mile of the border of this vineyard was examined, and although the shelter afforded the leaf hoppers was similar to that near the pomace heap, they were at no other place equally numerous. The hoppers attracted to the pomace in the fall evidently remained in the same locality over winter. The area providing winter shelter to the leaf hoppers was easily burned over and great numbers of the insects were destroyed.

DATE SCALE CONTROL

Nearly 3,000 date palms inspected in March.--Clean-up work was continued in the infested areas at Yuma, Ariz., and at El Centro and in the Coachella Valley, Calif. A total of 355 bushy palms was pruned to facilitate inspection. Fiber was stripped and leaf bases removed from 70 previously infested palms in Yuma. Inspection of the Reed Date Garden in the Imperial Valley was completed during the month and no scale was found. This is the only commercial planting still considered infested and in which ground and ladder inspection is being carried on at frequent intervals. The last infested palms were found in this garden in February 1934. During the month 2,201 palms in the infested areas were inspected from the ground only and 766 from ground and ladders.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Cultural treatments for control of sugarcane borer in corn and Egyptian wheat.--August I. Balzer, Beaumont, Tex., reports results of examinations of corn debris and Egyptian wheat debris from two areas of 1 square rod each. Cultural treatments were made on November 2, 1934, and examinations were made on March 6, 7, and 8, 1935. The numbers of sugarcane borers found after the various cultural treatments are shown in the following table. At the time of treatment the corn plats showed an average of 68 living larvae per square rod and the Egyptian-wheat plats an average of 300 per square rod.

Treatment	Diatraea saccharalis Fab.			Total
	Living		Dead	
	Larvae	Pupae	Larvae and pupae	
Corn	Number	Number	Number	Number
Standing stalks	8	1	74	83
Stalk cutter only	3	0	39	42
Disc only	2	0	31	33
Cutter and disc	1	0	15	16
Cutter and middle "buster"	0	0	7	7
Cutter and disc, and middle "buster"	1	0	2	3
Egyptian wheat				
Standing stalks	13	0	48	61
Stalk cutter only	6	0	21	27
Disc only	2	0	22	24
Cutter and disc	4	0	9	13

Survival of corn earworm pupae at Arlington Farm, Va.--F. F. Dicke, Arlington Farm, Va., reports that an area of approximately 200 square yards devoted to late sweet corn was examined late in March to determine to what extent Heliothis obsoleta Fab. had survived the winter. This area yielded a total of 79 pupae, 60 of which, or 76 percent, were living. Since considerable mortality occurs normally in the early pupal stage, it is evident that the mortality during the winter was unusually low. There was no significant difference between the depths at which the living and dead pupae were found. Although below-zero temperatures occurred in the vicinity of Washington, D. C., the ground was well protected by snow from frost penetration. Early in the fall the soil was unusually wet and the mortality was heaviest on low ground. Of the 19 dead pupae, it was determined definitely that 2 had been killed by disease. The dead specimens were usually found either embedded in their pupal chambers or heavily coated with silt. In the course of these examinations, hundreds of fall armyworm pupae were observed; however, not a single living specimen was recovered.

Pea aphid damage expected in California and Nevada.--An outbreak of Illinoia pisi Kalt. on alfalfa appears probable in the Antelope Valley of southern California this spring. The severity of this will depend upon weather conditions during early April. Periodic observations in western Nevada indicate the possibility of an outbreak there also.

JAPANESE AND ASIATIC BEETLE INVESTIGATIONS

Oviposition and larval abundance of Japanese beetle in cultivated fields.--I. M. Hawley and T. N. Dobbins, Moorestown, N. J., report that in 1934 an area approximately 1 mile square was selected in Salem County, N. J. During the summer of 1934 observations were made on beetle behavior and cultural practices in 70 fields in this area, and during the fall larval surveys were made in about 40 of these selected fields. Early in the season beetles fed most heavily on sassafras, wild grape, Virginia creeper, and smartweed until the available supply was destroyed. Early in July they moved to apple trees and fed until the foliage of these was destroyed, when they moved to lower, more succulent food plants, such as asparagus brush and corn. Late in June the beetles were observed balling in and on the surface of the ground early in the morning, then about 9 a.m. they would begin to fly and collect in large balls on plants along fence rows, more for mating than for feeding. The reason for larvae of the Japanese beetle occurring in fields planted to cultivated crops upon which the adults do not feed has always been questioned. It was noted that many beetles while in flight above such fields suddenly dropped and at once dug down between dry clods into the moist soil beneath. This was especially noticeable whenever a cloud passed over the sun. Between September 1 and December 1, 3,077 surveys were made in the fields in this area. The average larval population was 13.7 per square foot in pastures, 6.2 in alfalfa fields, 6.6 in cornfields, 6.2 in asparagus fields, 3.0 in tomato fields, and 2.3 in fields planted to pumpkins. Beetles do not feed on the two last-mentioned plants, but beetles in flight were observed to drop and enter the ground in these fields.

Percentage of diseased Japanese beetle larvae.--Messrs. Hawley and Dobbins state that in the total field population under various conditions the percentages of diseased larvae were as follows: Pastures, 0.5; cornfields, 1.5; alfalfa fields, 2.4; asparagus fields, 1.5. For the period during which these surveys were made, diseased larvae averaged 3.2 per square foot in sod land in the seasonal series of surveys in the older infested area.

Japanese beetle larvae develop faster in sod land than in cultivated fields.--Early in October, according to Messrs. Hawley and Dobbins, 95 percent of the larvae in pastures had reached the third instar, but in cornfields never more than 85 percent had reached this stage by the first of November. Larvae in asparagus, pumpkin, and tomato fields were as slow or slower in development than those in cornfields.

Stickers for derris.--L. D. Goodhue, Moorestown, submits the following results which were obtained by spraying lima bean leaves with a mixture consisting of 1 percent derris and 0.5 percent of the sticker.

Material	Loss after washing
	Percent
Blown sardine oil	5, 10
Blown menhaden oil[1]	10, 20
Blown menhaden oil[2]	15, 25
Raw menhaden	45, 50, 55
No sticker	90, 95

[1] A very viscous oil almost solid at room temperature.

[2] A less viscous oil than either the blown sardine or the first menhaden sample.

Decomposition of derris.--The rate of decomposition of derris in sprays can be reduced by excluding all light or the part of the spectrum that is responsible for this decomposition. The table below shows the amount of active derris remaining on glass plates exposed to the sunlight according to the method already reported.

Material added		Derris remaining after--		
		3 days	10 days	17 days
	Percent [1]	Percent	Percent	Percent
Lampblack	10	54	45	25
Titanium dioxide (in oil)	10	25	16	8.3
Aluminium powder (do.)	15	40	20	25
Chrome green (do.)	15	31	15	--
Chlorophyll (do.)		19	19	8.7
Chlorophyll (do.)		37	31	7.5
None	0	16	11	2.2

[1] Based on amount of derris. The percentage of chlorophyll in the cottonseed oil was not known.

Lampblack mixed with dry derris does not appear to give any protection when blown fish oil is used as a sticker. In previous tests, lampblack mixed dry with derris gave protection where agar was used as a sticker. Apparently the active principle in derris is being extracted by the blown fish oil. If this is true, it will be necessary to add the protective agent to the sticker instead of to the dry derris. This also suggests an important method of attack, as it will be possible to use antioxidants in the sticker.

Propagation studies with imported parasite of Japanese beetle.--In connection with the propagation of Tiphia popilliavora Roh., M. H. Brunson, Moorestown, reports that there are many of the parasitized hosts on which the Tiphia cocoons fail to form. A darkened area surrounding the point of attachment of the parasite egg on some hosts suggested that the dislodgment of the egg or small larva was not always the cause of the failure to form a cocoon. A number of host larvae showing the darkened area were sectioned, and the darkened area was found to be caused by a heavy deposit of chitin. In many cases the heavy layer of chitin was ten or more times as thick as the chitinous layer on a normal host. This condition suggested that possibly many parasite larvae died because they could not attach themselves to the host through this heavy covering, as they must necessarily do after hatching and after their first three molts. Apparently, either the presence of the parasite or the massaging of the host by the female parasite prior to egg attachment stimulates the hypodermal cells to secrete the heavy chitinous layer which might serve to protect the host from the parasite's attack.

Oviposition tests with native species of Tiphia.--R. T. White, Moorestown, has been conducting studies to determine to what extent native Tiphia species attack Japanese and Asiatic beetles and native hosts. Oviposition tests were conducted, using 10 Tiphia atlantis Allen and Jaynes, a native Tiphia found rather abundantly at Vincentown, N. J. Larvae of Macrodactylus subspinosus Fab., Pachystethus lucicola Fab., Ochrosidia villosa Burm., Autoserica castanea Arrow, Aphonus castaneus Melsh., two species of Phyllophaga, and Popillia japonica Newm., were used alone and in various combinations with these Tiphia. Only one egg was obtained on a P. japonica grub, and only one on a large species of Phyllophaga. Both of these failed to develop. Eggs were readily laid on a small Phyllophaga species and 61 percent of these eggs formed cocoons in an average of 31 days, at an average temperature of 72.8° F. These tests indicate rather conclusively that Tiphia atlantis will not accept P. japonica as a host, its natural host unquestionably being the small species of Phyllophaga found locally in the Vincentown area. It is seemingly very specific in its choice of host. Tests were also conducted with another native Tiphia species, Tiphia intermedia Malloch, found rather abundantly during August and September. This species accepts grubs of P. japonica readily, as only two individuals of this species were used, one of which died after laying 20 eggs in 24 days, whereas the other lived 47 days and laid 69 eggs. At the time of examination for cocoons, 32.5 percent of the grubs used were found alive with egg scars, showing that the eggs had not been securely attached to the host. Of the remaining grubs, 40.0 percent formed cocoons, thus showing that only 27.0 percent of the total number of eggs laid formed cocoons. Although this Tiphia readily accepts P. japonica as a host, its effectiveness as a Popillia parasite is limited, because of its failure to securely fasten its eggs to the host.

JAPANESE BEETLE CONTROL

Additional inspectors employed to supervise nursery shipments.--With business at nurseries and root-growing establishments mounting daily, inspection demands increased proportionately. A number of Japanese beetle inspectors temporarily assigned to Dutch elm disease eradication work returned to nursery and greenhouse supervision. In order to fulfill the emergency demands for inspection in New Jersey, one inspector was transferred from the Trenton district to the Glassboro section and another inspector was hired to assist in the White Horse district. A large increase in personal inspection calls made and certificates issued was reported from all districts of the regulated territories.

Experiments with paradichlorobenzene for destruction of Japanese beetle larvae extended.--Cooperative trials in fumigation with paradichlorobenzene by the Japanese beetle research laboratory and commercial growers have been extended to include blueberry, holly, franklinia, and rhododendron plants. Treatments of azaleas with this material have been so successful in two instances that growers who supplied plant material for the trials have requested additional fumigations.

Locust stock for soil-erosion control certified from New York.--Certifications in the New York area during March included two carloads totaling approximately 2,000,000 locust cuttings. They were shipped to Hoffman, N. C., where they will be used by the Federal Government in soil-erosion control operations. There were also certified for shipment from Long Island during March a total of 10,300 locust roots destined to points in Iowa, Ohio, Missouri, and Arizona. These will be used in experiments to determine the resistance of this variety to the locust borer.

Highway patrols for Japanese beetle quarantine started.--Road-patrol activities for 1935 were begun on March 29 with the establishment of two posts on the exit highways leading from the regulated area in Virginia. Additional posts were opened on two highways in the same section on March 31. These stations were established in time to check on the southward movement of plant stock for Easter sales. Expansion of the patrol system will be made as the movement of plant material increases with the advancing spring shipping season.

Scouting determines extent of gypsy moth infestations.--From observations made in the Lebanon, N. H., district since the last gypsy moth egg-laying season, it is apparent that the present distribution of egg masses is much the same as last year. Scouting in the vicinity of an infestation at Wells River, Vt., showed that it was still confined to an area adjoining the highway. Twenty-four man-hours of rough scouting in the town of

Fairfield, Maine, resulted in the creosoting of 724 gypsy moth egg clusters. This survey was made while the area was covered with 3 feet of snow. C. C. C. crews have been creosoting egg clusters in the vicinity of Laconia, N. H. A heavy infestation in this locality borders a much-traveled highway. In Meredith, N. H., the town has a foreman and a crew of six men painting egg clusters within the village limits. This locality is also heavily infested.

Production mounts in face of personnel turnover in Dutch elm disease work.--Defections from the eradication crews began early in March, when many of the experienced tree surgeons and tree climbers resigned to resume their own private businesses or return to their former positions with commercial tree firms. Newly enlisted men will require conditioning before assignment as replacements in eradication crews. High water in many swampy sections containing high concentrations of dead and dying elms also hampered the work in such areas. Despite these handicaps the crews eradicated during the month a total of 137,836 dead and dying trees and 149 diseased specimens. Scouts surveying the work area for dead and dying trees, tagged a total of 223,026 trees, bringing the grand total of dead and dying trees located since the winter campaign began to 571,555, of which total 335,131 were still standing.

Four-page pamphlet on Dutch elm disease issued.--Receipt from the Government Printing Office during the month of Department Circular No. 353, "The Dutch elm disease eradication project: Federal, State, and local cooperation", by L. H. Worthley, is proving of considerable assistance in answering the large volume of correspondence received daily from community officials, clubs, and individuals interested in combating the disease. A generous supply of the circular is available for distribution wherever there is a demand for information on this subject.

FOREST INSECT INVESTIGATIONS

Reemergence complicates life history of western pine beetle.--Results secured by K. A. Salman, of the Berkeley, Calif., laboratory, by caging infested trees in the Modoc National Forest indicate that reemergence of some adults and even a second reemergence of some individuals is a normal feature in the life history of the western pine beetle infesting ponderosa pine in California. As many as one-fourth of the adults originally attacking a green tree reemerge from that tree after laying eggs, and join in attacks on other green trees. This results in the maintenance at a high level of the population in any given attack found during the active season, a level much higher than would be the case if the natural rhythm of the primary generations were not complicated by the attacks of the reemerged adults.

Flathead-borer infestation found to reduce effectiveness of western pine beetle broods.--Dr. Salman also reports that experiments with forced attacks by the western pine beetle on ponderosa pine trees in the Modoc National Forest showed that flathead borers, Melanophila californica Van Dyke, when attacking trees also infested by the western pine beetle, reduced the effectiveness of the latter. On one tree in which infestation by the two species occurred in the bark covered by one emergence cage but not in that covered by a second cage, the flatheads resulted in a net production of but 18 western pine beetle adults per square foot, as against 121 per square foot where flathead broods did not occur. On another tree in which infestation by the two insect species occurred, the net emergence was but 24 percent of the number of individuals that attacked the same bark area.

Western pine beetle larvae fail to develop after prolonged exposure to cold.--J. M. Miller, of the Berkeley, Calif., laboratory, announces that studies conducted at that laboratory have shown that mature larvae of the western pine beetle are killed by cold at temperatures ranging from 5° to -7½° F., 1 hour of exposure being sufficient to kill all individuals at the latter temperature. At higher temperatures within this range, certain larvae will die and others survive. This is apparently owing to some metabolic condition in certain larvae which enables them to resist freezing. Following short exposures to temperatures ranging from 5° to -5°, these survivors will resume development, pupate, and transform to adults when brought back to warm temperatures, around 70° to 80°. Recent studies have shown, however, that if the exposure is prolonged, survivors lose their ability to continue development. Tests at 0° F. show that surviving larvae are capable of completing development if the exposure does not exceed 4 days. With 5 days' exposure, practically no surviving larvae were capable of resuming development. When the period of exposure was extended from 6 to 18 days, about 10 percent of the larvae survived and continued to live. However, these survivors were unable to pupate and all died within 60 days when brought back to warm temperatures. These results indicate that in the field a prolonged cold spell, with temperatures around zero, will produce a much higher mortality of the overwintering population of the pine beetle than will a brief period of cold.

Winter control work on Lassen National Forest completed.--Lumberman Vance Brown, of the Forest Service, has just completed a summary of work accomplished on the Hall's Flat and Little Valley Control projects on the Lassen National Forest. This work extended from November 15 to March 1. A total of 5,000,000 board feet of infested timber was treated at a cost of $28,000. These projects were a battle with heavy snow and other trying conditions. The spotters were obliged to cruise continually on snowshoes until the last week or two of the period. This condition, combined with a heavy infestation, exceeding 600 trees on some sections, made the work of spotting slow and expensive.

Subzero temperatures kill overwintering mountain pine beetle broods.--A. L. Gibson and T. T. Terrell, of the Coeur d'Alene, Idaho, laboratory, spent 2 weeks in the latter part of January and the early part of February in southwestern Montana, northwestern Wyoming, and east-central Idaho, to determine the effect of a period of severe cold on the overwintering stages of the mountain pine beetle in lodgepole and white-bark pine. Samples taken from infested trees in different areas and at various elevations and exposures were brought to the Coeur d'Alene laboratory, where they were examined to ascertain the extent of mortality. Temperature records from the various areas showed that the severe cold had occurred only over a limited area extending from the Yellowstone River Valley north of Yellowstone Park and south of Livingston, Mont., west to the Big Hole Basin and south to the Idaho, Montana, and Wyoming State lines. In comparing samples from this area with those from areas of more normal winter temperatures, it was found that the subzero weather had apparently resulted in some mortality. Within the cold belt, mortality ranged from 40 to 84 percent in lodgepole pine and from 19 to 48 percent in white-bark pine. In the areas of warmer temperatures, the mortality was found to be only from 9 to 14 percent.

Bark-beetle control projects in the northern Rockies.--James C. Evenden, Coeur d'Alene, reports that control operations against bark-beetle outbreaks on the Coeur d'Alene National Forest in Idaho, the Blackfeet Indian Reservation in Montana, and the Shoshone National Forest in Wyoming have been recommended for the coming season. These projects will all start as early in the spring as weather conditions will permit. On the Coeur d'Alene Forest this season's operation will be the sixth year of control that has been directed against an outbreak of the mountain pine beetle in western white pine. This project is the largest operation planned for the coming spring, and will involve an expenditure of approximately $63,000 for the treatment of 8,500 trees. Some of the work in connection with this operation will be conducted by C. C. C. labor, while regular control crews will be used in the more inaccessible areas. On the Blackfeet Indian Reservation, control measures will be instituted against an outbreak of the Douglas fir beetle in the scenic and commercially valuable Douglas fir stands of that area. The Shoshone National Forest project is also directed against an outbreak of the Douglas fir beetle in stands of Douglas fir previously defoliated by the spruce budworm, and this will be the fifth year control has been conducted against this insect in that area. As a result of these 4 years of control, the general infestation has been reduced 82 percent and the scenic forests of that area have been preserved.

Winter mortality of locust borer larvae.--R. C. Hall, of the Columbus, Ohio, laboratory, reports that recent examinations of a number of locust trees have indicated that the winter mortality of locust borer larvae in northeastern Ohio has been approximately 8 percent.

Insects transmit Dutch elm disease.--W. D. Buchanan, of the Morristown, N. J., laboratory, reports two additional positive cases of transmission of the Dutch elm disease by Scolytus multistriatus Marsh. Mr. Buchanan accomplished this by a technic he has not seen described before, but which has a bearing on a type of transmission he believes to be important in the field. In experiments the beetles were reared from a diseased tree and placed in battery jars with sections of disease-free logs in which to construct their egg galleries. After the galleries had been formed, several were cut out and plated by C. S. Moses, of the Bureau of Plant Industry. Ceratostomella ulmi was isolated from two of the four logs used in the experiments.

Severe termite damage in New England.--Recently R. A. St. George, Washington, D. C., found severe termite damage in several houses in Plymouth, Mass. Many sills and some of the uprights had to be replaced. Houses only 9 years old had every floor joist damaged. One floor laid 2 years ago was quite badly infested. In another building it is reported that where the termites had been cut off at the first floor they had extended numerous shelter tubes from 2 to 12 inches long through the ceiling over night. One tube was left undisturbed and attained a length of 30 inches before they stopped. Other timbers in place only 2 weeks were found to have been attacked. The repair work on these houses was of particular interest, as the contractor is following out rigidly the Department's recommendations for control. This, among other measures, includes the use of termite shields in termite-proofing the houses. Other cities reported to have extensive termite damage in places are Acton, Concord, Littleton, Cambridge, Northampton, and Holyoke, in Massachusetts, and New Haven and Westport, in Connecticut.

GYPSY AND BROWN-TAIL MOTH CONTROL

Scouting for gypsy moth in New England.--In the New England section of the barrier zone scouting was continued during March, in Massachusetts, in the extreme southwestern part of Berkshire County, and in Connecticut, in the northwestern part of Litchfield and the southern part of New Haven Counties. In the former State over 9,000 acres of woodland and nearly 50 miles of roadside in open country were scouted and only 2 gypsy moth egg clusters were found and destroyed. In the latter State over 5,000 acres of woodland and 14 miles of roadside in open country were examined, and over 1,100 egg clusters were found and destroyed. The gypsy moth work in New England, east of the barrier zone, has been continued during the month in 18 different C. C. C. and V. C. C. camps. During the month scouting was performed by assigned quotas from the different camps in towns in the immediate vicinity of their locations. These scouts covered 71,936 acres of woodland and 352 miles of roadside, in open country, and destroyed 78,751 gypsy moth egg clusters.

Gypsy moth work in Pennsylvania.--In Pennsylvania, scouting by the 40-foot strip method or by the intensive method practiced in areas of known infestation was carried on in eight towns in the infested area. Over 7,000 acres of woodland and 15 miles of roadside in open country were scouted and 4,798 egg clusters were found and destroyed.

One gypsy moth egg mass found in New Jersey.--In New Jersey, around the area where male gypsy moths were attracted to assembling cages in the summer of 1934, 340 acres of woodland and 3½ miles of roadside in open country were scouted and one gypsy moth egg cluster was found and destroyed.

PLANT DISEASE CONTROL

Blister rust control work in South Carolina.--Roy G. Pierce, regional supervisor of blister rust control work in the southern Appalachian States, gives the following summary of control work in South Carolina for the year

1934: In South Carolina, which is at the extreme southern limit of its range, white pine makes a rapid height growth, 2 feet per year being very common, while an occasional 3-foot growth has been noted. Reproduction is taking place wherever seed trees are numerous. On the property of a prominent citizen of Pickens there are three large white pines ranging from 9 to 11 feet in circumference and approximately 100 feet in height. In their immediate vicinity, on an area of 1½ acres, between 400 and 500 young white pines have seeded in. As a result of our interest in his white pines, the owner has cleared out the brush and weed trees and is giving the young pines a chance to survive. Although no native wild Ribes were located, cultivated bushes of three species were found in abundance in the white pine section, viz, Ribes grossularia, the common garden gooseberry; R. rotundifolium, the roundleaf gooseberry; and R. vulgare or sativum, the cultivated red or white currant. At 58 places in Oconee and Pickens Counties a total of 2,213 of these cultivated bushes were destroyed with the owners' consent.

Effect of logging practice on Ribes growth.--Field observations made during the past 3 years in the Inland Empire western white pine areas indicate that wild Ribes growth may be controlled to a considerable extent by regulating methods of logging and brush disposal. In this region Ribes are generally temporary species in the upland forest types. The Ribes are carried over from one forest cycle to another by means of dormant seeds which remain viable in the lower strata of the forest mantle. These seeds germinate and establish new plants only when the forest mantle is destroyed or severely disturbed, as by forest fires or logging operations. It was observed that areas on which the brush had not been burned after logging showed the lowest average number of Ribes viscosissimum. Areas on which the brush was piled and burned showed a 30 percent increase in the number of Ribes over areas on which the brush was not burned. The greatest number of Ribes found after logging appeared on areas where the timber was clear-cut, followed by a broadcast burning not sufficiently intense to consume all of the organic mantle.

Barberry spread in the drier areas of South Dakota.--A recent report from R. O. Bulger, district leader in charge of barberry eradication in South Dakota and Nebraska, briefly summarizes a situation that was encountered in Meade County, S. Dak., in 1934. Mr. Bulger reports that an inspection was made of an old ranch located not far from the foothills of the Black Hills region, where some planted barberry bushes had been eradicated some years ago. The average annual rainfall in this area is less than 20 inches and the vegetation more or less typical of the "west river" country. An area consisting of 20 sections was surveyed around this location, with the result that more than 70 barberry bushes, some of them from 6 to 7 feet tall and producing seed, were eradicated. The bushes were scattered among wild plum and buffalo berry along ravines where the seed had been distributed by birds. According to Mr. Bulger, the work conducted in 1934 indicates that there is considerable territory in western South Dakota that may require intensive inspection to insure eradication of remaining bushes.

Testing barberries for reaction to stem rust.--L. M. Ames, Jamaica Plain, Mass., reports that during the past year more than 200 separate collections, representing about 110 distinct species and varieties of barberry, were obtained largely from the Arnold Arboretum and sent to the barberry garden at Bell, Md., for propagation. The purpose is to make outdoor susceptibility tests of all available barberry species, varieties, and hybrids. The first outdoor test inoculations of these species and seedlings were made by R. U. Cotter in September 1934. Mr. Cotter is now (April 15) making inoculations for a second outdoor test of the entire barberry collection at Bell.

COTTON INSECT INVESTIGATIONS

Toxicity tests for boll weevil, cotton leaf worm, and Lygus apicalis.--G. L. Smith, J. C. Clark, and A. L. Scales, Tallulah, La., conducted a large series of cage toxicity tests with a number of insecticides for the boll weevil, the cotton leaf worm, and *Lygus apicalis* Fieber at that laboratory in 1934. Phenothiazine was tested at 5, 10, 25, 50, and 75-percent, diluted with sulphur, tobacco dust, kaolin, hydrated lime, and also at full strength. It was not effective against any of the insects, even at full strength. Powdered derris and cube root were used at 0.5, 1, 2, and 4-percent rotenone content. Derris was mixed with kaolin, sulphur, tobacco dust, and lime, whereas only kaolin was mixed with cube. Derris containing 4 percent rotenone killed 92 percent of the weevils, as compared to an 82-percent kill for calcium arsenate and a 75-percent kill for cube with 4 percent rotenone. At the lower concentrations derris was not effective, although the kill was better at all concentrations in all of the tests than was cube of the same rotenone content. Against the leaf worms derris (4 percent rotenone) killed 73 percent of the leaf worms, as compared to a 60-percent kill for cube of the same strength and a 93-percent kill for calcium arsenate. Neither derris nor cube were effective against *Lygus*, the kill being 45 and 41 percent, respectively. Pyrethrum dust containing 0.25 percent pyrethrins I and II was tested against boll weevils and leaf worms. The kill was low for weevils but for leaf worms was equal to calcium arsenate. A mixture of 80 percent calcium arsenate and 20 percent copper arsenite killed 79 percent of the weevils, as compared to an 85-percent kill with calcium arsenate. There was some burning of the foliage with this mixture. Mixtures of calcium arsenate and lime (1 - 1 and 1 - 2) caused a mortality of 70 and 66 percent of the weevils, respectively, as compared to a kill of 86 percent with calcium arsenate. Hydrated lime alone caused no appreciable increase in kill over the checks. Sulphur was tested in various combinations with paris green, calcium arsenate, sodium fluosilicate, and derris against the boll weevil, the leaf worm, and *L. apicalis*. Sulphur alone had very little effect on the leaf worm, was about half as effective against the boll weevil as was calcium arsenate, and gave fair control of *Lygus*. Mixtures of 1 part paris green with from 2 to 4 parts of sulphur caused a high kill of boll weevils, leaf worms, and *Lygus*, but all of these combinations caused considerable burning of foliage. Calcium arsenate, mixed with from 1 to 4 parts of sulphur, was not as effective against the weevil as was the undiluted calcium arsenate, but all concentrations gave a high kill and were equally as effective against the leaf worm as was calcium arsenate. Sulphur mixed with sodium fluosilicate decreased its effectiveness and caused burning. Undiluted paris green was the most toxic insecticide tested against all three species, but caused considerable damage to the foliage. However, the burning from undiluted paris green was not so severe as from the sulphur-paris green mixtures. Lime added to paris green (1 - 1, 1 - 2, and 1 - 3) decreased the burning and the toxicity to the insects in proportion to the quantity added. Mono-hydrated copper sulphate was not effective, either alone or in mixtures, against any of the three insects.

Time-of-day applications of calcium arsenate.--Messrs. Smith, Clark, and Scales also conducted a series of cage tests at Tallulah to determine the time of day when calcium arsenate dusting was most effective for weevil control. Series of 18 cages each were dusted at sunrise, at noon, and at sunset during August. The mortality in cages dusted at sunrise was 84 percent; in those dusted at noon, 77 percent; and in those dusted at sunset, 72 percent.

Boll weevil survival in various types of shelter.--The annual spring examinations of Spanish moss to determine the number of boll weevils that survived the winter in that shelter were made from March 4 to 12 at Tallulah, La., and at Florence, S. C. At Tallulah an average of 5.2 live weevils were found per ton of moss examined and at Florence an average of 4. Examinations have been made at Tallulah for the past 20 years. In 10 of these years, a larger number of live weevils were found per ton of moss examined than in 1935 and in 10 years a smaller number of weevils were found than in 1935. The same number of live weevils were found at Florence in 1934 as in 1935, but the number found in 1935 was less than the number found in any of the years from 1929 to 1933, inclusive. Two hundred and eighty 3 by 6 ft., or 18 sq. ft. samples of such shelters as wood's trash, weeds, grass, soil, rotten stump, rotten log, cornstalks, and cotton stalks were collected and examined for hibernating boll weevils. Examinations at Tallulah were made during January and February and at Florence during December, January, and February. Samples were collected at Tallulah in cotton fields, adjacent to cotton fields, and at distances of 25, 50, 100, 150, 200, and 300 feet from the fields. All of the weevils found were within 100 feet of cotton fields. At Florence samples were collected adjacent to cotton fields and at distances of 150 and 300 feet from the fields. All weevils found were in the samples adjacent to and 150 feet from the fields. At Tallulah an average of 663 live weevils per acre were found for all types of shelter examined and, at Florence, an average of 175 live weevils were found.

Notes on cotton root aphids.--In reporting observations of 33 consecutive generations of the brownish-purple cotton root aphid (Rhopalosiphum sp.), F. F. Bondy and C. F. Rainwater, Florence, S. C., state: "This species is able to pass the winter in all stages in South Carolina, and during December, January, February, and March, it went through approximately eight complete generations. About the middle of March the white root louse (Trifidaphis phaseoli (Pass.)) was found abundantly on the roots of vetch. The corn root aphid (Anuraphis maidi-radicis Forbes) was found on the roots of several host plants throughout the winter, and on April 2 was found on the roots of vetch and four other plants."

Cotton flea hopper.--The first hatching of cotton flea hopper nymphs from overwintering eggs in hibernation cages at Port Lavaca, Tex., was reported by K. P. Ewing and R. L. McGarr on February 19. During February and March a total of 3,039 nymphs hatched, as compared to 19,931 nymphs from comparable cages during 1934. During the first quarter, the minimum temperature was 19.5° F., as compared to 30° in 1934. The mean temperature this year was 68° or over 7° higher than for the corresponding period last year. Rainfall was 5.24 inches, as compared to 12.17 inches for the first quarter of 1934. Nymphs were found on March 6 and on March 25 adults were collected on goatweed. At College Station R. W. Moreland found nymphs on croton during the last week of March. The first adult hopper taken by sweeping weeds was collected on March 28; however, 2 days previously J. C. Gaines had collected at College Station, Tex., 7 adults on screens, indicating that they were migrating at that time.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Pink bollworm control work in Florida.--Most of the work in March has consisted in completing the recleaning of wild-cotton areas previously cleaned and the cleaning of a few new small colonies located near the recleaned areas. The situation from Key Largo to Key West is very encouraging, as all of this area has been recleaned, and in some sections where wild cotton was very abundant a second recleaning this season has been made. Practically all of the old area along the west coast has also been recleaned, but a few new colonies, located during this recleaning, were not cleaned. These new colonies, however, are all very small and do not present any new or difficult problems. Work in the Florida Bay section had to be discontinued before all of the old areas had been recleaned. During the month some 400 acres were recleaned, from which 904 mature, 110,200 seedling, and 6,522 sprout plants were removed. The new colonies cleaned for the first time covered 31 acres and contained 6,141 mature and 1,936 seedling plants. During this recleaning some wild cotton bolls were inspected but no specimens of the pink bollworm were found.

Trap-plot cotton in the Big Bend area of Texas.--All of the trap-plot cotton in the Big Bend was planted between March 10 and 26. As previously mentioned, there are 2 plots in the Castolon district in Brewster County and 8 in the Presidio district in Presidio County. The cotton is now up to a good stand. The 2 plots at Castolon are making very rapid growth, some of the plants now having four leaves. In the Presidio section, because of cool nights and some windy days, the plants have not been making such rapid growth; however, they should be far enough in advance of the main crop to serve their purpose. All of the farmers intend to observe the delayed planting date of April 15. On the Mexican side a few farmers may plant about April 10 because of water conditions, but the majority will not do any planting until after the 15th.

Thurberia weevil in Arizona.--As a result of laboratory inspection, another light infestation of the Thurberia weevil has been located on a farm 5½ miles north of Tucson. This makes a total of five farms on which infestation has been found in the 1934 crop. All infestations are very light, and the fact that gin-trash inspection was negative indicates that they occurred late in the season on the top crop of bolls. Recent reports are to the effect that so far this year rainfall is a little above normal and, as a result, weevils are beginning to emerge somewhat earlier than usual from the Thurberia plants in the mountains. In all probability these early weevils will not be of any consequence, as there is not yet any material for them to feed on.

Laboratory inspection for the pink bollworm.--Laboratory inspection at San Antonio and a number of field stations has gone forward satisfactorily. So far, 25 specimens of the pink bollworm have been found. These were taken from material collected in two of the older infested areas--the El Paso Valley of Texas and the Pecos Valley of New Mexico. It is of interest to note that results have been negative, not only in the material inspected from the newer infested areas, but in material from outside the regulated areas.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Asparagus affords unfavorable environment for Pacific coast wireworm.--E. W. Jones and K. E. Gibson, of the Walla Walla, Wash., laboratory, report that in 1932 soil samples disclosed that there were approximately 14.72 Limonius (Pheletes) canus Lec. per square foot at the time an acre of garden land was planted to asparagus. Similar samples taken in this asparagus field 3 years later (March 1935) yielded an average of approximately 5.64 of these wireworms per square foot. This represents a reduction of approximately 62 percent in the original wireworm population during the 3-year period.

Relative humidity is an important influence on Mexican bean beetle development.--N. F. Howard and R. W. Brubaker, of the Columbus, Ohio, laboratory, report that experiments conducted in temperature cabinets showed that a temperature of 89.6° F., with a relative humidity of 60 percent, was more favorable for the duration of life of adult Mexican bean beetles and for the development of bean beetle larvae on potted plants, than was the same temperature at 80-percent relative humidity. However, in these series of tests the bean beetle pupae, when exposed to the same temperatures, developed slightly faster and yielded a higher percentage of adults at 80 percent humidity than at 60 percent.

Life-history studies conducted on a mushroom fly, Sciara sp.--In life-history studies of Sciara sp., A. C. Davis, of the Takoma Park, Md., laboratory, obtained the following results: Average length of life, 3.7 days; average number of eggs per female, 115.8; average number of eggs per day per female, 30.8. Sciara females in the laboratory laid their eggs singly or in groups of from 2 to 27, the average number of eggs per group being 5.03. These counts were made in the laboratory with a temperature fluctuating from 75° to 80° F. in the daytime and dropping to around 60° at night.

Sulphur fumigation does not injure compost.--According to Mr. Davis, recent observations in mushroom houses that were fumigated with sulphur during "peak heat" indicated that the sulphur fumes produced by burning sulphur did no damage to the compost. In one instance the yield was around 2 pounds of mushrooms per square foot of bed space, whereas the average production is approximately 1½ pounds per square foot.

Seasonal development of larger bulb fly.--C. F. Doucette and Ralph Schopp, of the Sumner, Wash., laboratory, report that throughout the winter months changes in the status of the larvae of the larger bulb fly (Merodon equestris Fab.) are not apparent. On March 21 at Olympia, Wash., 20 percent of all larvae, or 25 percent of the mature larvae, had left the bulbs to pupate. On March 23, 38 percent of all larvae, or 62 percent of the mature larvae, had left the bulbs. The seasonal development for 1935 is considered normal. At Sumner the larvae began to pupate the last of February. Considerable numbers of larvae left the bulbs after March 6 and their pupation was noted from 7 to 10 days later. It is believed that after leaving the bulbs, the larvae spend about a week in the soil before they pupate. This period may vary, however, with the soil temperature.

Bulb mite injury of Easter lilies.--Randall Latta, Sumner, in studying the effects of the feeding on the host plant of the bulb mite (Rhizoglyphus hyacinthi Bdv.), has found that when the lily bulb is dormant heavy infestations are usually centered on the outside lower scales. After growth starts the mites appear to attack the stem just at the nose of the bulb or slightly below the tip of the scales. In numerous plants examined the center of the stem was hollowed out at this point and feeding was observed to occur upwards to a point an inch above the soil level and downward to the basal plate. Feeding stops when the hard basal plate is reached. The stem is hollowed until it becomes weak and no longer able to support the weight of the foliage above. In preliminary control tests, in which mites were isolated from the bulbs and suspended in 4 cubic centimeters of tap water in small vials and these in turn subjected for short periods to 110° F. in a constant-temperature water bath, it was found that eggs hatched in all samples up to and including 25 minutes, but none hatched in the 30-minute exposure. In similar tests, but in which the mites were treated in their natural environment within the bulbs, it was found that a 30-minute treatment effected complete control of the mites. This indicates that practically all mites are in positions easily accessible to water or other liquids, as no time was required for heat penetration.

INSECTS AFFECTING MAN AND ANIMALS

Preparations for extensive screw worm control campaign.--D. C. Parman, W. E. Dove, and E. W. Laake, in charge of the field laboratories at Uvalde, Tex., Savannah, Ga., and Dallas, Tex., respectively, spent several days in Washington during the latter part of March, conferring on plans to be followed in the proposed screw worm control campaign in the Southeast. Later, accompanied by F. C. Bishopp, they visited various points in the Southeastern States to determine the location of central field headquarters from which the control and research work will be directed. The control work will be under the supervision of Mr. Dove and the research phase of the program will be handled by Mr. Laake. Mr. Parman will be in direct charge of the work in

Mississippi. Under the proposed plan, the work will be carried out in cooperation with the various States. The Bureau of Entomology and Plant Quarantine will have full charge of the activities, and it is proposed to furnish to the farmers and stockmen the necessary medicine for treating infested animals, and the materials for building hospital pens and chutes; also to hold meetings and demonstrations to teach livestock owners approved methods of preventing screw worm infestations and of treating injured animals. The States are expected to cooperate in the work by providing for the proper distribution of materials and assisting in the organization of local communities for the employment of concerted control measures. Individuals in a community will be responsible for the actual treatment and handling of their stock.

Allantoin, a chemical substance found in maggot excretions, stimulates healing of wounds.--The remarkable healing effects produced by maggots in discharging wounds led to an analysis of their excretions to determine whether they introduce any substance into the wound which stimulates the healing process. Allantoin, a normal constituent of the urinary secretions of maggots and other animals, has been found to have healing properties. This material can be purchased, and when prepared as a weak solution and applied on gauze dressings to nonhealing wounds it promotes cleansing and healing. The claim is not made that this substance will replace maggots in the treatment of these wounds, as maggots appear to play a definite role which, so far, has not been duplicated. William Robinson, Washington, D. C., visited several hospitals in New York, Newark, N. J., and Pittsburgh, Pa., where the maggot treatment has been given extensive use. He conferred with the surgeons who are using this method and observed the very satisfactory results of this treatment in various cases of infected wounds. He also observed the healing effects of the allantoin treatment, which is being tried out in these hospitals.

Florida counties active in mosquito-control work.--According to reports made by W. V. King, Bureau representative in Florida, on a recent mosquito situation in that State, antimosquito measures are being pushed forward rapidly under the direction of county organizations. In St. Lucie County a P. W. A. project has been approved for the diking of several miles of marsh area as a combined sand fly and mosquito control measure. A marked reduction in mosquitoes last summer was reported from Martin County. The decrease in numbers of these pests was attributed to the C. W. A. and F. E. R. A. ditching projects. New antimosquito districts have been organized in Dade and Broward Counties to fight the Dengue-fever mosquito, and also the species that breed in the salt marshes.

FOREIGN PLANT QUARANTINES

Recent entomological interceptions of interest.--Twenty-one living larvae of the Mediterranean fruit fly were intercepted at San Pedro, Calif., in eight coffee berries in passenger's baggage from Hawaii. A pupa of this fruit fly was also taken at Chicago in a decayed tangerine in the mail from Italy. Eggs of the European tussock moth (Notolophus antiqua L.) arrived at Philadelphia on a Manetti leaf in cargo from the Netherlands. This lymantriid, which occurs in Europe and North America, is also known as the antique tussock moth, rusty tussock moth, and vapourer moth. Egg masses have frequently been found on fruit and rose stocks from Europe. *Phenacaspis dendrobii* Kuw. was intercepted in May 1934, at Honolulu, Hawaii, on an orchid (*Dendrobium draconis*) in the mail from Siam. This represents the first interception record of this scale insect in our files. The alien scale *Chrysomphalus alienus* (Newstead) arrived at San Francisco on orchids in baggage from Guatemala. This scale insect is recorded from Florida. The sugarcane scale(*Targionia sacchari* (Ckll.)) was intercepted at Miami, Fla., on stalks of sugarcane from Nassau, Bahamas. A living specimen of the treehopper *Nessorhinus gibberulus* Stahl was collected last December on yam foliage in the field at Mayaguez, P. R. A living specimen of *Exptochiomera oblonga* Stahl (Lygaeidae) was taken at Nogales, Ariz., in a bell pepper arriving by truck from Mexico. Living larvae of the narcissus bulb fly (*Merodon equestris* Fab.) were intercepted last December at New York in cipollino (*Muscari comosum*) bulbs in cargo from Morocco. This syrphid has also been taken in hyacinth from the Netherlands and in narcissus from Canada, England, France, and the Netherlands. A living specimen of *Mecistorhinus melanoleucus* Westw. (Pentatomidae) arrived at Charleston, S. C., with banana debris in cargo from Guatemala. Specimens of *Megastigmus bipunctatus* (Swed.) were intercepted last November at Washington, D. C., with *Juniperus* sp. seed in the express from Issyk Kul, Union of Soviet Socialist Republics. A. B. Gahan, who made the identification, states: "This species is recorded in Europe as a parasite of Lepidoptera that infest juniper. In my opinion, however, the species is probably a seed chalcid in juniper seed."

Recent pathological interceptions of interest.--*Albugo tragopogonis* (DC. S. F. Gray was intercepted on *Tragopogon porrifolius* from France on February 6 at New York (first interception). *Alternaria herculea* (Ell. & Mart.) J. A. Elliott was intercepted at New York on February 13 on white greens (*Brassica* sp.) from Cuba (first interception). *Bacterium citri* Hasse was found on oranges from Japan on March 13 at Seattle and on March 14 at San Francisco; and on March 20 at San Francisco on citrus leaves, also from Japan. A bacterial pod spot of peas from Mexico was determined as *Bacterium pisi* (W. K. Sackett) E. F. S. on two lots intercepted at El Paso on March 8 (first interceptions so determined). *Bacterium* (*citriputeale*) *syringae* (van Hall) E. F. S. was intercepted from Spain for the first time on March 12 on two lots of lemons at New Orleans. *Cercospora capsici* Heald & Wolff was intercepted on March 4, and again on March 27, at New Orleans in cargo shipments of peppers from Cuba. The only previous interception was made in 1926. The second interception of *Cercospora* sp. on leeks from Japan was made at Philadelphia on March 13. The first interception of *Colletotrichum atremantarius* (B. & Br.) Taub. on potato was made March 14 at Gulfport, Miss., in potatoes from Italy. The disease had previously been intercepted on eggplant from Canada and Cuba. The first interception of the genus *Gibberella* on wood was an undetermined species found at New York on February 20 on cases from Mexico. *Glomerella cingulata* (Ston.) Spauld. & Schrenk was intercepted on March 18 at New Orleans on chayotes from Cuba. We find no previous report of this disease on this host. *Phyllosticta ruscicola* Dur. & Mont. was intercepted on March 18 at Philadelphia on ruscus from Italy (first interception). *Puccinia allii* (DC.) Rud. was intercepted on February 17 at Philadelphia on garlic from Brazil. This is the first definite determination of this species among interceptions from South America. The fungus is not typical for the species, is apparently variable, and we do not yet have a practical method for routine specific determinations of such material. Septoria drummondii Ell. & Ev. was intercepted on March 26 at the Washington inspection house on phlox from England (first interception). Septoria insularis B. & Br. was intercepted at the Washington inspection house on March 22 on Hedera sp. from England (first interception). Sphaeronema sp. was intercepted on March 22 at Philadelphia, our first interception of this genus on carrot. The material was from England.

Peony diseases intercepted from the Orient.--Pestalozzia sp. has been intercepted on peonies offered for entry from time to time and has been collected on imported material being grown in the field, but apparently no species of Pestalozzia has previously been reported as occurring on peony. From the standpoint of the mycologist, it is unfortunate that most material for peony disease interception either is too old or too young, and also too fragmentary, for study.

Bean pod borer from Mexico.--Three living larvae of Maruca testulalis Geyer were intercepted last January at Laredo, Tex., in string-bean pods in cargo from Mexico. While this olethreutid has been taken on numerous occasions in shipments from Cuba and has arrived from China, Dutch Guiana, Haiti, Hawaii, Japan, Puerto Rico, and Tahiti, this represents the first record in our files of this insect being intercepted from Mexico.

Star-apple with numerous fruit-fly larvae.--Eighteen living fruit fly larvae were intercepted recently at New York in a single star-apple in ship's stores from Jamaica. The fruit fly larvae were identified as Anastrepha acidusa Walk. (?). There were 30 fruits in all, 26 of which were destroyed on board ship and four of which were brought into the office for closer examination. One fruit of the four was found infested.

Boy's pocket yields infested mango.--Two boys crossing the bridge from Mexico at Brownsville, Tex., carrying no packages were released and were moving away when the plant-quarantine inspector noticed a peculiar swinging bulge in the hip pocket of one of them. They were called back and the bulge turned out to be, not the usual assortment of juvenile odds and ends, but a mango which on examination contained 24 living larvae of the Mexican fruit fly (Anastrepha ludens Loew).

Suspicious-looking insect found on European celery.--An interception in New York on February 23 of a single pupa in celery root in ship's stores supposedly from Belgium has been reported to be a coleopterous insect belonging in the genus Atomaria. The interception is of definite interest, because one species of Atomaria (A. linearis) has been reported from Europe as doing considerable damage to beets. Although this pupa possibly represents another species than the one known to attack beets, its discovery is a definite indication that inspectors should be on the lookout for injurious species of this type.

Rice-straw dunnage matting harbors borer.--A small 2-foot square of coarse rice-straw matting of the type commonly used in the Orient for dunnage, was discovered on the pier in Baltimore on March 1. No objection is raised to the presence of this material in the ship's hold, but the policy has been not to allow it to be taken on shore. The correctness of this attitude is well demonstrated in the present case; the Baltimore inspectors who examined the fragment of matting found in it three living larvae of *Chilo simplex* Butler, the Asiatic rice borer, an important pest of rice in the Orient.

DOMESTIC PLANT QUARANTINES

Chicago parcel-post frequency.--A careful survey of all incoming mail and express trains arriving at the various Chicago terminals has been worked out and charted, giving the frequency, by half-hour periods, when parcel post is available for inspection at the conveyor belt in the terminal post office, to determine whether shipments are being made in compliance with Federal domestic plant quarantines. The time of arrival of trains from all sections of the country, classed into 15 divisions in relation to areas under quarantine, is shown, as well as States of destination. Some 12,000 labels, removed from sacked mail by postal clerks during a 24-hour period when it was dumped onto the conveyor belt, were made available for the purpose of this analysis.

Freight-inspection systems reported.--Reports of systems of freight inspection used at both Philadelphia and Chicago have recently been received from inspectors of these stations. At Philadelphia, large quantities of freight pass through two transfer points, one of which is the largest transfer point in the East, while in Chicago freight must be checked at a large number of points. Each system is valuable as to the situation covered, and copies of the reports are being sent to transit inspectors at other cities.

Identification of elm.--The quarantine on Dutch elm disease having been placed effective February 25, it became necessary to provide inspectors with specific instructions as to the identification of dormant elm nursery stock. Such instructions were issued as Circular 52-T dated March 22.

Eradication of wild peach trees improves orchards.--Many peach growers in Georgia have recently expressed confidence that the eradication of escaped peach trees, a work carried on by the C. W. A. in the winter of 1934, has done much toward solving the problem of phony peach disease control. Other growers have commented on the noticeable decrease in the number of curculios infesting trees in orchards so protected, as compared with orchards not so protected.

Peach borers scarce in Texas nurseries.--Winter inspections for peach borers in Texas nurseries, in connection with certification with reference to the phony peach disease, resulted in finding remarkably few borers. Of the 57,507 trees inspected in 15 nurseries, only 18 trees were found infested, and 57 damaged, by borers. Their scarcity is believed to be due to the hot, dry summer.

Citrus canker inspections.--Of interest in the March work was the thorough inspection made of Galveston County, Tex., and the destruction by that State of all *Citrus trifoliata* trees in the town of Alta Loma in Galveston County, where eight properties infected with the citrus canker were found during the winter. It is hoped that the destruction of these trees will aid in preventing a recurrence of the canker in this locality. Inspections made in Louisiana, Mississippi, and Alabama resulted in finding no citrus canker.

CONTROL INVESTIGATIONS

Toxicity of insecticides.--D. E. Fink, Orlando, Fla., has completed his study of the relative toxicity of optically active and inactive forms of dihydrodeguelin and isorotenone, the tests having been made against culicine mosquito larvae. The optically active compounds were decidedly more toxic than their optically inactive isomers. Optically active dihydrodeguelin was more toxic than rotenone.

New technique for rearing house flies.--W. N. Sullivan, Takoma Park, Md., is studying the possibilities of altering the usual method of rearing house flies for insecticidal tests so as to obtain puparia instead of adults. This may simplify the turntable method by making it unnecessary to chill flies for counting into petri dishes. Instead, the puparia can be counted into dishes and the flies treated in the usual way after emergence in the dishes. The percentage of emergence can easily be determined for each test by examining the puparia by transmitted light. R. H. Le Pelley, Kenya Colony, British East Africa, is to be a guest of the Takoma Park, Md., laboratory from April 9 to May 27, 1935. During this period he will use the turntable method for studying the action of mixtures of rotenone and the pyrethrins on house flies.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Weevil larva in carrot found at quarantine.--A coleopterous larva tentatively identified by A. G. Boving as *Ceutorrhynchidius terminatus* Hbst., was sent in from New York, collected in ship's stores on February 27, 1935, by K. F. Petsch (N. Y. No. 37256). This insect has been reported to be injurious in carrot fields in Denmark and is also recorded from England, but in wild carrot only.

A small beetle pupa intercepted in celery roots.--An advanced beetle pupa, presumably from Belgium and placed by Boving, Fisher, and Chapin as *Atomaria* sp. (family Cryptophagidae), was collected at quarantine in New York in February 1935 (N. Y. No. 36620). The interception is of interest because one species of the genus, *Atomaria linearis* Stephens, has been reported doing much damage to beets in England, Germany, and France.

New North American weevil records.--Three exotic species of weevils, not heretofore reported from North America, have been found by L. L. Buchanan among specimens recently submitted for identification. One is a *Sitona*, evidently a European species, and possibly *S. cylindricollis* Fahr. The second is a species of *Myllocerus*, not specifically identifiable at present, but probably of Japanese origin. Both of these species were collected in

Connecticut by M. P. Zappe and submitted by W. E. Britton. The third species is the European Philopedon plagiatus Schaller, two specimens of which were collected on Amherst Island (Gulf of St. Lawrence) by the Bowdoin-MacMillan Arctic Expedition.

The genus Meteoridea rediscovered.--Included among parasites of the oriental fruit worm reared in Japan and Chosen, submitted by G. J. Haeussler and identified by C. F. W. Muesebeck, were two specimens of an apparently undescribed species of the braconid genus Meteoridea Ashmead. This genus was previously known only from a unique male specimen from Florida.

Irish shamrock yields immature leafhoppers.--Nymphs of a leafhopper tentatively identified by P. W. Oman as Megophthalmus scanius Fallen have been intercepted at quarantine recently. First-instar nymphs were obtained at Baltimore, Md., on March 14, 1935, by W. A. Ranck, and one second (or third) instar nymph at New York, N. Y., on March 13. The related Ulopa reticulata Fab. has been found previously on heather from England. Neither species is known to occur in this country.

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NEWS LETTER

FOR APRIL 1935

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APPROPRIATIONS FOR THE BUREAU

On April 17 the President signed an act making appropriations to the Department of Agriculture for the fiscal year 1936. The appropriations include $7,801,421 for the Bureau of Entomology and Plant Quarantine. Of this amount the following sums were made immediately available: $2,500,000 for chinch bug control; $480,000 for screw worm control; $261,156 for Dutch elm disease eradication; and $1,000 for the study of azalea insects.

FRUIT INSECT INVESTIGATIONS

Aluminum paint increases effectiveness of tin traps for Mediterranean fruit fly.--O. C. McBride, of the Bureau's fruit-fly laboratory at Honolulu, Hawaii, reports that several years ago the Mediterranean fruit fly trap in most common use was made of tin. Under Hawaiian conditions the tin rusted very quickly. A glass trap was found to be much more satisfactory. More recently it has been found that the tin traps could be maintained in good condition by coating them with aluminum paint; also that the aluminum-painted traps for some reason or other are more effective, capturing on the average more than twice as many male flies as do the glass traps. Kerosene is being used as the bait in all of these traps but it is not attractive to females.

Delayed effect of lime-sulphur on San Jose scale.--Oliver I. Snapp and J. R. Thomson, of the peach-insect laboratory at Fort Valley, Ga., have found that the effect of applications of lime-sulphur during the dormant period for the control of the San Jose scale was not fully evident until several months after the spraying was done. The data obtained in last winter's experiments are given in the following table.

Treatment (December 15)	Average percentage of scale alive			
	Before spraying on Dec. 15	One month after spraying	Three months after spraying	Four months after spraying
Liquid lime-sulphur (Baume 32.6) 1 part to water 6 parts----	86.33	67.66	43.83	10.0
Liquid lime-sulphur (Baume 32.6) 1 part to water 7 parts----	87.33	77.0	49.66	21.5
Liquid lime-sulphur (Baume 32.6) 1 part to water 8 parts----	87.17	79.66	51.83	33.2
Check - untreated----	85.83	86.33	80.83	(1/)

1/ Twice-stabbed ladybeetles (larvae and adults) cleaned up scale on check trees between March 15 and April 15.

It is evident that final counts to determine the mortality resulting from the application of liquid lime-sulphur should not be made until several months have elapsed. Counts made 1 month after the application cannot be depended on for reliable conclusions.

Mulberry shade trees and the raisin moth in the San Joaquin Valley.--H. C. Donohoe, of the dried-fruit insect laboratory at Fresno, Calif., reports that mulberries have been planted extensively for shade trees in the fruit-producing districts of the San Joaquin Valley. Mulberries fruit in the early spring before other food crops for the raisin moth, such as apricots, first-crop figs, and peaches, ripen. During the same period the raisin moth emerges from hibernation and fallen mulberries lying in the shade under the trees become heavily infested. An estimate of 1,120,000 developing larvae has been obtained from the fruit under one tree. The raisin moth attacks all of the dried fruits produced in the San Joaquin Valley. The infestation occurs in the field, the moths laying their eggs on the fruit largely while it is drying in stacked trays and in boxes on the ranches. In the 1932 fig crop the losses from insect attack, largely by the raisin moth, were estimated at $216,000.

DATE SCALE CONTROL

Clean-up work in Arizona completed.--All previously infested palms of record have been trunk-pruned and all seedling jungles within the infested areas have been thinned and pruned, so that effective inspection is possible. Inspection in the infested area in the Imperial Valley was continued during the month and no scale was found. No scale has been found in the valley, except in one planting, for 2 years. In the Coachella Valley 789 palms were pruned to facilitate inspection. A total of 1,419 palms were inspected and no scale was found. Offshoot cutting is under way and 2,661 offshoots were inspected and certified as free from Parlatoria scale. Most of these offshoots are planted locally but some are shipped out of the regulated area. One shipment was sent to South Africa and one to Palestine.

MEXICAN FRUIT FLY CONTROL

Work progresses in lower Rio Grande Valley.--The harvesting season for citrus fruits in the lower Rio Grande Valley closed at midnight, April 2. Very little commercial fruit was left on the trees at that time. The tree-to-tree inspections started immediately and the greater part of the area was cleaned before the middle of the month. Two larval infestations were found during the clean-up period. Trapping was continued throughout the month and 65 adult *Anastrepha ludens*, 300 *A. pallens*, 2 *A. fraterculus* auct., and 15 *A.* sp. "Y" were taken during the month in the valley area. Three adult *A. ludens* were trapped in Webb County and 12 in Brooks County. In these two counties and in Jim Wells County 23 *A. pallens* and 1 *A.* sp. "Y" were taken. Three adult *A. ludens* were trapped in Matamoros and 2 *A.* sp. "Y" were taken in the brush south of that city. Larvae of *A. ludens* taken from market fruit in Matamoros and Reynosa totaled 682. In market fruit in Matamoros 3 larvae identified as *Anastrepha* sp. not *ludens* were collected. Two spraying outfits operated throughout the month. Nicotine-sulphate-molasses spray was applied to 34,743 trees on 75 premises.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Grasshopper eggs overwinter in good condition in Montana.--According to J. R. Parker, Bozeman, Mont., in March large quantities of eggs of *Camnula pellucida* Scudd., *Melanoplus bivittatus* Say, and *M. mexicanus* Sauss. were dug from the ground in Sweetgrass County in south-central Montana and were brought to the laboratory to rear grasshoppers for bait experiments. Nearly a 100-percent hatch was obtained whenever these eggs were held at a temperature of 80° F. for a period of 10 days. This indicates that winter conditions have been favorable for egg survival and that a normal hatch may be expected as soon as hatching temperatures occur.

Number of instars varies in economic species of grasshoppers.--R. L. Shotwell, Bozeman, reports as follows: Most of the species of grasshoppers observed went through from five to six instars in their nymphal development. The percentages of all the males and all the females for each species going through five instars and those going through six instars are given in the following table. This table also includes the number of individuals of both sexes upon which these percentages are based. In practically every case a much greater percentage of the females went through six instars than of the males. *Melanoplus femur-rubrum* DeG. reared from eggs collected in Tennessee almost invariably went through six instars, whereas a greater proportion of those from Montana went through five. *M. differentialis* Thos. is not included, because the records showed that it invariably went through six instars.

Species	Total individuals		Five instars		Six instars	
	Male	Female	Male	Female	Male	Female
	Number	Number	Percent	Percent	Percent	Percent
M. bivittatus	244	241	93.0	59.3	7.0	40.7
M. mexicanus	18	15	77.8	60.0	22.2	40.0
M. femur-rubrum (Montana)	78	95	97.4	96.8	2.6	3.2
M. femur-rubrum (Tennessee)	27	20	0.	10.0	100.0	90.0
M. packardii	77	57	92.2	71.9	7.8	28.1
Dissosteira carolina	119	115	96.6	78.3	3.4	21.7
M. gladstoni	1	9	100.0	77.8	0.	22.2
Camnula pellucida	28	35	100.0	97.1	0.	2.9

Nemic parasite of corn ear worm discovered.--W. H. Larrimer, of the Rosslyn, Va., laboratory, reports as follows: "This parasite was first taken from the hibernation experiment with the corn ear worm at Moorestown, N. J., and has proved to be a very interesting find. As it was discovered in early winter, the observations have necessarily been confined to the laboratory. It has been determined by G. Steiner, of the Division of Nematology of the Bureau of Plant Industry, as a new species of Neoaplectana, but has not yet been described. Technique has been developed for experimental infection of various hosts under laboratory conditions. Corn ear worms are readily infected. Mortality of the host occurs in from 1½ to 2 or 3 days, depending on the size and stage of development of the ear worms and the number of free-living nemas infecting the individual worm. A complete cycle of the nema from egg to adult takes approximately 1 week. Eggs develop, are fertilized, and have been observed to hatch within the female nema; the young worms causing the death of the mother and finally rupturing the body wall and escaping after devouring the body contents. From 8 female nemas approximately 1,000 young developed, an average of 125 per female, and a range of from 18 to 220. Under conditions not yet understood, the body wall of the female nema ruptures and the ovaries and eggs are exposed before the eggs hatch. Extreme drying out seems to be fatal to the nema larvae, although they roll up in ropes or balls for protection when there is a shortage of moisture. Unlike other closely related nemas, Neoaplectana sp. is not at all specific in its host requirements. In addition to the corn ear worm, the entire life cycle of the nema, from free-living form to free-living form, has been reared on the larval stages of the fall armyworm, the spotted cutworm, the common cutworm (Feltia ducens), the housefly [1] and the alfalfa weevil. Other hosts that are now being tested include various species of white grubs, cutworms, wireworms, and the codling moth. Attempts made in cooperation with the Division of Nematology of the Bureau of Plant Industry to rear this species on artificial media have not been successful to date. Veal-dextrose-yeast-agar has been tried in various combinations and densities without success. Free-living forms remained alive and infective in tap water from late in December 1934 to March 31, 1935."

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[1] Material furnished through the courtesy of Dr. Sullivan, of the Takoma Park laboratory.

Disease and parasitization in army cutworm.--H. H. Walkden, Manhattan, Kans., reports that rearings of larvae of this species, collected in March in various localities in Kansas, have shown a high mortality from disease and parasitization. The table shows the comparative conditions for the localities from which collections were made, also the average for the State.

Locality	Larvae observed	Healthy larvae	Larvae parasitized	Larvae killed by wilt	Larvae killed by fungous disease
	Number	Percent	Percent	Percent	Percent
Manhattan---	80	65	11	8	16
Ellsworth---	112	14	12	29	45
Bucklin------	77	52	23	9	16
Coldwater---	107	8	10	68	14
Average----	--	31	14	32	24

Many of the larvae showed symptoms of wilt disease at the time of collection and the most common fungus was the green muscardine.

Birds fond of pea aphids.--According to E. T. Jones, so much difficulty was experienced in maintaining a population of pea aphids on alfalfa plants being tested for resistance in plots in the field and in plats on the laboratory grounds at Manhattan, that it was found necessary to cover the plants with a screen-wire cage to keep out the birds. The birds were so eager to obtain the aphids for food that they kept the alfalfa plants cleaned.

JAPANESE AND ASIATIC BEETLE INVESTIGATIONS

Prevention of decomposition of derris by light.--Reporting further on the decomposition of derris, L. D. Goodhue, Moorestown, N. J., says: "The materials listed in the table below have been added to derris in an attempt to retard its normal rate of decomposition. Because of the varying amount of sunlight during any period of exposure, each group of determinations included derris with blown fish oil for a standard of comparison. The values in the last two columns give the number of times more active derris remained on the plate of treated derris than that on plates sprayed with derris and blown fish oil. For example, plates sprayed with white pyroxylinenamel and derris had 5 times more active derris, after 5 days' exposure, than plates sprayed with derris and blown fish oil. The comparison is made in the same way for the 10-day period.

Material added	Percentage[1]	Sticker	Exposure	
			Five days	Ten days
White pyroxylin enamel	100	Pyroxylin	5.0	3.5
White pyroxylin enamel	100	do.	3.6	5.7
Lampblack on dry derris	10	Agar-agar	4.5	4.8
Casein	50	Casein	3.9	2.4
Rosin residue plus asphalt 50-50	100	Rosin asphalt	3.5	3.5
Lampblack	10	do.	3.1	2.5
Agar-agar	25	Agar-agar	2.7	2.5
Rosin residue	100	Rosin residue	2.5	2.5
Liquid asphalt in blown oil	50	Blown oil	2.5	1.2
Asphalt emulsion	100	Asphalt	2.5	1.7
Black pyroxylin enamel	100	Pyroxylin	1.9	3.2
Lampblack on dry derris	10	Blown oil	1.8	1.5
Pyrogallol in blown oil	5	do.	1.5	1.3
Black pyroxylin enamel	100	Pyroxylin	1.4	1.4
Lampblack in oil	10	Blown oil	1.2	1.1
Lampblack on dry derris	15	do.	1.1	.9
Black paper dye on derris	--	do.	1.1	2.6
Green paper dye on derris	--	do.	.7	1.4
Green pyroxylin enamel	100	Pyroxylin	.8	1.2
Lampblack dry on derris	20	Blown oil	.55	.6
Lampblack in oil	10	do.	.5	.6
Green dye, water soluble	--	do.	.35	.5

[1] Based on quantity of derris.

"The average amount of active derris remaining on glass plates sprayed with derris and blown fish oil is close to 10 percent after 5 days' exposure. With agar or casein as a sticker, about 30 percent remains at the end of the same period. This seems to indicate that the derris is extracted by blown oil, thus bringing the active principle into a transparent medium where it will be easily decomposed by light. A laboratory test shows that derris is readily extracted by blown fish oil. This property disqualified the blown oils for use with derris regardless of their excellent sticking properties. The addition of dry pigments to derris or the application of dyes gives no protection when blown fish oil is used as a sticker. Blown fish oil and asphalt appear to be better than the blown oil alone. When a sticker such as casein or agar, which does not extract the derris, is used some added material to protect it from the light does cut down the rate of decomposition. Lampblack with agar or white pigment in pyroxylin enamel are examples. The rate of decomposition with rosin residue is less than when blown fish oil is used as a sticker."

Treatment of balled and potted plants to destroy immature stages of Japanese beetle.--J. W. Lipp, Moorestown, says that plants treated at Whitesbog by plunging for 5 days in soil containing 10 pounds of paradichlorobenzene per cubic yard, included 6 varieties of blueberry (Rubel, Pioneer, Cabot, Concord, June, and Jersey), franklinia, magnolia, and American holly. Since the expiration of the treatment the plants, which were heeled into open ground, have been examined several times. The treated plants have suffered no apparent injury, with the possible exception of the holly, the leaves of which show signs of darkening and dropping. However, as a similar condition exists on the untreated plants, kept indoors in untreated soil for 5 days, the treatment cannot be considered responsible. The wood of the treated and untreated holly plants is equally good. Preliminary tests with surface applications of soil containing 50 pounds paradichlorobenzene per cubic yard of soil to potted azaleas indicate that a complete kill of grubs in either 3-inch of 4-inch pots can be obtained with exposure for 9 days or longer and in 5-inch pots for 13 days. In these tests the treated soil was applied to the top of the pot only, as compared with the present recommended method of plunging the pot ball in treated soil. By this new method it may be possible to treat potted plants without the necessity of first removing the pot and replacing the plant in the pot after treatment.

JAPANESE BEETLE CONTROL

Violator of Virginia Japanese beetle quarantine fined.--Termination of the project's first prosecution under the Virginia crop pest law for a violation of the State Japanese beetle quarantine has resulted in a fine of $25 and costs. The violation involved intrastate movement from Richmond to Ellerson on November 17, 1934, by J. H. Thompson of 1,125 seedlings and 275 perennial plants. The uncertified plants had been shipped via express to Richmond from Bristol, Pa., a point heavily infested with the Japanese beetle. H. B. Ward, district supervisor in Richmond, appeared before the Hanover County grand jury on March 18 and a true bill was returned. On April 19 the defendant appeared in the circuit court and pleaded guilty, with the resulting fine.

Twenty-one inspectors added to road-patrol force.--Strengthening of the Japanese beetle road patrol was accomplished by the establishment in April of 15 additional stations, manned by a corps of 21 inspectors. Ten of the stations are operated on a daily staggered schedule of 8 hours. The four posts already in operation in Virginia were supplemented by 4 additional stations opened early in April. Patrols were posted on 5 highways leading from the regulated area into West Virginia. On the Pennsylvania-Ohio State line 5 posts were opened. Although most of the posts were in operation for only half of April, 13 Japanese beetle grubs were removed from soil about the roots of plant material intercepted and certified at the highway stations. Among infested contraband intercepted, were 3 peony plants containing 3 larvae en route from Wilmington, Del., to Richmond, Va.; 1 potted plant also containing 3 larvae being transported from Philadelphia, Pa., to Boggs Run, W. Va.; and 2 violet clumps in the possession of a motorist from Washington, D. C., going to Petersburg, Va.

Nursery inspections at peak.--Japanese beetle certificates issued in the Philadelphia district in the first half of April exceeded any semimonthly issuance of last year. From April 1 to 15, 12,939 certificates of all types were used by classified establishments. Last year the largest number issued was 9,653. On April 9 last, 2,046 certificates were issued, the highest number for any one day this year. Corn borer certificates issued tripled over the previous semimonthly period. It was necessary to assign an additional inspector to one large nursery in the Philadelphia area to take care of the Easter rush.

Autogiro tested for aerial scouting for Dutch elm disease.--Two experimental observation flights by autogiro were made late in April to determine the feasibility of aerial scouting for trees infected with the Dutch elm disease. On April 25 a half-hour flight was made by one observer from a field near Willow Grove, Pa. Two half-hour flights with different observers were made on April 30 from Roosevelt Field, on Long Island. The maneuverability of the ships at low speeds and altitudes was particularly noted. The autogiro is able to cruise from 150 to 200 feet from the ground, at speeds less than 40 miles per hour. By flying into a good wind the ship may be held almost stationary over a tree top, giving ample time to determine wilting or other symptoms. Visibility at the low altitude is about one-quarter mile. Results of these two flights are considered satisfactory enough to justify at least a short trial period in actually scouting infected and adjacent territory.

Dutch elm disease eradication accomplishments.--Trees eradicated during April totaled 91 diseased elms and 155,996 dead and dying trees. Scouts systematically covered 479.7 square miles in the work area and tagged an additional 223,627 dead and dying elms. Since the beginning of the current sanitation campaign 392,420 dead and dying trees have been cut down and destroyed. There remain standing 402,762 dead and dying specimens tagged for removal. There were 10 confirmed trees standing at the end of the month, awaiting State action to clear them for removal.

FOREST INSECT INVESTIGATIONS

Large control project nears completion.--F. P. Keen, of the Portland, Oreg., laboratory, reports that on the Warm Springs Indian Reservation of eastern Oregon the Indian Service, using Indian C. C. C. labor, will soon complete the disposal of western pine beetle infestation over the largest continuous area of ponderosa pine forest ever treated in such work. Practically the entire ponderosa pine type of the Warm Springs Reservation, or approximately 65,000 acres, has already been covered and 15,000 infested trees have been felled, peeled, and burned. Inspection showed that the character of the work was uniformly excellent.

Ips beetles raise havoc in experimental thinnings.--Mr. Keen also reports that a stand of even-aged, 46-year-old ponderosa pine was carefully thinned to an 8 by 8 foot spacing. The slash was left on the ground and developed large broods of Ips beetles which, upon emerging in the fall, attacked the green trees and killed such a high percentage of them as to destroy the value of the thinning experiments. Similar damage was widespread throughout the pine forests of Oregon during 1934, wherever logging operations, C. C. C. road development, and other cutting of timber left quantities of slash to serve as breeding material for Ips beetles.

Mountain pine beetle adults reemerge in sugar pine.--Studies on the habits of adult beetles by G. R. Struble, of the Berkeley, Calif., laboratory, during July and August 1934, near Northfork, Calif., indicate that the extent of emergence of adults is influenced by overcrowding and host resistance. Tests were made by forcing new adults to attack 3 caged green logs and a caged portion of a green tree. The results obtained from green logs showed the same emergence from logs attacked by 10 and 20 beetles per square foot of bark area, while the emergence from a log attacked by 40 beetles per square foot of bark area was five times as great. All emerged beetles reattacked green logs and laid eggs; however, in a standing green tree attacked by 30 beetles per square foot the number of adults that emerged was negligible. Such evidence indicates that in sugar pine the second attack of reemerged adults may be a factor only during epidemic conditions, when overcrowding occurs because of lack of host material. Records of brood development during the past season show that a general decline in infestation was evident in 1934, as compared with the two previous seasons. The reason for this could not be ascertained.

Third generation of western pine beetle complicates control work in northeastern California.--According to K. A. Salman, Berkeley, forest-insect control crews in the Lassen National Forest found it necessary to treat approximately twice as many overwintering brood trees as had been expected from estimates based on results of plot surveys late in September. To date (May 10) 136 trees per section have been found to contain overwintering brood on the Blacks Mountain project and 495 trees per section is the average for the Little Valley area. Fully two-thirds of the overwintering trees were found to have been attacked late in the fall and two-thirds of the total number of trees infested during the entire year contain overwintering brood. Explanation of these unusual conditions is furnished by results of the brood studies carried out on the Modoc National Forest during 1934. It was found that over half of the population in trees infested by the second generation of the western pine beetle emerged before winter to attack as a third generation. This is a much greater emergence of second-generation brood than occurs normally. Sufficient brood remains in most second-generation trees to warrant treatment as overwintering broods. This combination of circumstances has made it necessary to treat the unusually large number of third-generation trees and practically all of the second-generation trees.

Salvage logging plans given impetus by heavy losses from beetle attacks.--Dr. Salman also reports that continued heavy infestations by the western pine beetle in ponderosa pine stands of the Shasta, Modoc, Lassen, and Plumas forests of northeastern California have compelled lumber companies operating in those areas to use special methods in logging infested trees as a means of reducing infestations and salvaging timber.

Elm bark beetle experiments.--D. L. Parker, of the Morristown, N. J., laboratory, reports regarding experiments in which sticks of elm were submerged in water to determine the effects of this treatment on the larvae of

Scolytus multistriatus Marsh. present in the sticks. The sticks ranged from 1¼ to 4¼ inches in diameter and were from 10 to 12 inches long. Approximately half of the sticks were floated on water and the remainder were completely submerged in water in a greenhouse when they were brought in from outdoors on January 4, 1935. The floating sticks gradually sank and at the end of 2 weeks all were submerged. On March 8 some of the sticks were removed from the water and placed in battery jars. Adults of S. multistriatus have since issued in the jars.

Notes on parasites.--P. B. Dowden, of the Melrose Highlands, Mass., laboratory, reports that 200,000 hibernating larvae of the larch case bearer were received early in April from W. F. Sellers of the Hyeres, France, laboratory. This material was collected at Feitzer-Kanzel, Austria. The first parasites appeared on April 26 and between that date and April 30 the following had issued.

Parasite	Males Number	Females Number	Total Number	Remarks
Chrysocharis laricinellae (Ratz.)	3,667	1,951	5,618	Primary
Cirrospilus vittatus Walk	--	--	177	Primary and secondary
Cirrospilus pictus Nees	--	--	87	Primary and secondary

The first colony of Chrysocharis laricinellae, consisting of 1,100 males and the same number of females, was liberated at Woodstock, Conn., on April 30. Mr. Dowden also reports that a colony of 29 males and 45 females of the tachinid Lypha dubia Fall. was liberated in an infestation of the European pine shoot moth at Branford, Conn., on April 12. These parasites were received as puparia from Austria during the summer of 1934. Schizonotus sieboldi Ratz., a parasite of the willow leaf beetle (Plagiodera versicolora Laich.), definitely overwinters as an adult. A number of active adults were removed from hibernation cages. P. A. Berry, of the Melrose Highlands, Mass., laboratory, reports that hibernating adults of Ephialtes examinator (Fab.), an imported parasite of the European pine shoot moth, will oviposit freely in pupae of the forest tent caterpillar.

GYPSY AND BROWN-TAIL MOTH CONTROL

Gypsy moth work in barrier zone.--The gypsy moth work in 18 C. C. C. camps, east of the barrier zone in New England, was continued throughout the month. The crews were cut during the first part of the month, owing to the new enrollment period. The men continued doing creosoting, cleaning, and burning work, in addition to scouting. During April this work resulted in the creosoting of 81,681 gypsy moth egg clusters, the cleaning of 50 acres where infestation existed, and the scouting of 61,825 acres of woodland and open country.

PLANT DISEASE CONTROL

Educational work in barberry eradication.--In preparation for the 1935 survey and eradication season in Indiana, W. E. Leer, in charge of barberry-eradication work in that State, and his assistant have given illustrated talks to school children in all of the rural and many of the city schools in about 20 counties. In this way they reached 703 grade and 83 high schools, with a total attendance of 45,400 pupils. Since the beginning of this type of work in Indiana, demonstrations have been given in more than 1,000 grade schools and 650 high schools, with the result that children have reported approximately 125 scattered infestations of barberry. Frequently reports of a single bush have led to the eradication of many others when surrounding territory was inspected by the survey crews. A brief circular, prepared particularly for distribution to school children and containing a request for the cooperation of school officials in connection with the barberry-eradication program, was mailed recently to each school superintendent in Ohio. Harry Atwood, in charge of the eradication program in that State, reports a response from more than 80 percent of the people who received copies of the circular. During the past year 450 Ohio teachers have written the barberry-eradication office at Columbus requesting teaching material relating to the control of stem rust. During 1934 55 new barberry infestations were reported by school children, resulting in the eradication of more than 3,400 barberry bushes.

Local cooperation in blister rust control.--Up to 1934, inclusive, local cooperation has been excellent, as evidenced by 1,685 town appropriations totaling $470,270.40, and by 30 county appropriations of $7,474.64, in addition to the cooperation of 40,459 individual owners who expended $472,070.60, or its equivalent in labor, to eradicate Ribes on their properties. Thousands of additional owners of pine permitted the destruction of their cultivated Ribes bushes without compensation. This year 65 towns in New Hampshire and Maine have appropriated $15,625 for control work and 7 additional New Hampshire towns have signified their intention of setting aside some unemployment funds for blister rust control work.

White-stemmed gooseberry eradicated by use of powder.--T. H. Harris, Oakland, Calif., reports that powder is being used satisfactorily in the eradication of Ribes inerme found growing in meadow land and along the borders of some of the slower moving streams in certain parts of the sugar pine belt of the northern Sierra Nevada of California. In these locations this species of Ribes grows inextricably intermingled with willows and other species of brush in dense thickets.

Survey to determine practicability of blister rust control in Colorado and Wyoming.--A pine-Ribes survey of forest lands in Colorado and Wyoming was initiated in 1934 and will be continued during 1935. There are about thirty million acres of forest land in Colorado and Wyoming, most or all of it within the boundaries of 24 national forests, 3 national parks, and 1 Indian reservation. The results of the survey indicate that there are over four and one-quarter million acres of forest land on 12 national forests, 3 national parks, and 1 Indian reservation supporting white pine and that over one-half million acres of this area support comparatively valuable white pine stands. It is estimated that the completed survey will show that there are in the two States approximately one million acres which support stands of white pine of relatively high value. Within the stands of white pine already examined, 11 species of Ribes were found. In upland types from 1 to 38 Ribes bushes per acre were found, while in the moist stream bottoms the number ranged from 18 to 279.

Eradication season opens in southern Appalachian region.--Blister rust control work in the southern Appalachian States for the 1935 Ribes-eradication season has gotten off to a good start. In Maryland, 105,000 wild Ribes and 475 cultivated Ribes were destroyed during April on 10,405 acres of land. Virginia reports 28,916 acres on which 40,055 wild Ribes and 4,498 cultivated Ribes were eradicated by crews from four C. C. C. camps working in the Shenandoah National Park and the George Washington National Forest, and by P. W. A. laborers in the counties of Washington, Carroll, Giles, and Rockbridge. A smaller amount of Ribes-eradication work was also carried on in North Carolina, with 14,175 acres worked and 474 bushes destroyed; South Carolina, with 23,600 acres worked and 289 bushes destroyed; and Tennessee, with 1,366 acres worked and 205 Ribes removed. Most of these Ribes were cultivated bushes. In West Virginia a crew from a C. C. C. camp has been engaged in the eradication of Ribes from around the United States Forest Service Nursery at Parsons, removing 473 bushes from 154 acres.

COTTON INSECT INVESTIGATIONS

Boll worm breeds through winter at Brownsville, Tex.--On January 27, 1935, 5 days after the temperature had been as low as 24° F. at Brownsville, Tex., T. C. Barber collected from ears of corn that had been partially protected from the frost three larvae of Heliothis obsoleta Fab. These specimens were transferred to cotton bolls in the out-door insectary. They fed readily on the cotton bolls. One died soon after collection but the other two developed normally and entered the soil to pupate. One pupa was accidentally injured and died. The remaining specimen emerged as a moth on March 10, 1935. It had entered the soil as a larva on February 8; therefore 30 days were spent underground in the prepupal and pupal stages.

Boll worm emergence from hibernation at College Station, Tex.--R. K. Fletcher, of the Texas Experiment Station, cooperating with this Bureau, reports the emergence on March 20, 1935, of one boll worm moth from cages in which approximately 400 boll worms entered the soil last fall. This is the earliest record of emergence of a boll worm moth at College Station, where boll worm hibernation studies have been made for several years. In the field alfalfa plants were examined almost daily during March. The first egg was found March 22. Eggs were found almost daily after that and first-instar boll worms were found on alfalfa on March 28 and 29. During April 16,500 corn plants were examined for oviposition and plant injury. Corn planted at different dates on black upland, sandy-loam upland, and Brazos River bottom land was examined from the time it came up. The corn was not attractive to ovipositing moths until it was from 8 to 10 inches high. So far this season, more eggs have been found on the upland corn than on the bottom-land corn. This is in accordance with moth emergence, which was earlier and heavier from upland soils.

Overwintering pink bollworm population.--A. J. Chapman and assistants of Presidio, Tex., have reported an examination of field samples to determine the numbers of pink bollworm larvae hibernating in different environments. Samples of soil, surface trash, and forms on the plants were collected after the final picking last November and December. The soil was washed through sieves immediately after being collected and the material separated was dried and stored, together with the surface and plant material, until January, when it was examined. Sixteen fields were sampled, 8 of which were also examined last year. The numbers of pink bollworms in different environments in these 8 fields in 1933 and 1934 were as follows:

Location	Square yards examined		Larvae per square yard					
			On stalks and surface		In soil		Total	
	1933	1934	1933	1934	1933	1934	1933	1934
	No.	No.	No.	No.	No.	No.	No.	No.
Gray #1----	7.0	5.0	8.0	11.0	2.3	0.8	10.3	11.8
Gray #3----	5.0	5.0	39.2	21.8	3.0	3.6	42.2	25.4
Adobes-----	10.0	5.0[1]	21.8	27.6	4.5	3.3	26.3	30.9
Sparks-----	10.0	5.0	3.1	0.6	1.1	0.2	4.2	0.8
Fortine----	10.0	10.0	4.5	0.4	0.3	0.1	4.8	0.5
Baldwin----	5.0	5.0	12.6	14.4	2.2	0.6	14.8	15.0
Pena--------	5.0	5.0	1.6	17.0	1.4	1.2	3.0	18.2
Alvarado---	5.0	5.0	6.0	36.0	1.0	0.2	7.0	36.2
Average--	7.13	5.63	12.1	16.1	1.97	1.25	14.07	17.35

[1] 5 sq. yds. of surface and stalks equal 10 sq. yds. of soil.

The wide variation in the worm population in different fields may be attributed to such factors as degree of infestation, extent of late fruiting, and cleanliness of the cotton when picked. There appears to be no correlation between the population on the plants and in the soil. The soil population, as determined by these examinations, varies somewhat with the type of soil. In the heavier soils there are frequently large cracks and the infested material that drops into these cracks is considered part of the soil population, along with the larvae that go into the ground and spin cocoons. There was an average of 16.1 worms per square yard, or 93.2 percent, on the plants and surface trash and 1.25 worms, or 6.8 percent, in the soil. There was a higher worm population on the plants and surface trash and a lower soil population than last year. One field was selected for examinations to determine the mortality during the winter. The soil was left undisturbed and samples collected and examined the first of each month showed the following numbers of live worms per square yard: 7.1 larvae on January 1; 5.6 on February 1; 4.4 on March 1; and 1.3 on April 1. These examinations show a considerably greater survival than was found for similar dates last year.

Storage of pink bollworms.--L. W. Noble, W. T. Hunt, and L. C. Fife, Presidio, Tex., have reported on a satisfactory method of storing overwintering pink bollworm larvae. During the cotton-ginning season last fall the worms were collected from gin trash and allowed to spin cocoons between sheets of paper, where they remained over winter or until needed for parasite-breeding work. Paper towels were placed in large garbage pails with tight-fitting covers, between which the worms spun up. Several hundred worms were placed on a layer of the towels in the cans and another layer of the towels was placed over them. This was repeated daily until the cans were filled with layers. The cans containing the worms were allowed to remain in the insectary at normal temperature. Some of these worms were of the short-cycle type and completed development. Some died from mechanical injury. A high percentage, however, lived over winter and were found to be in excellent condition as hosts for parasite breeding. Rather light cocoons were spun and when the sheets of paper are pulled apart most of the worms are left bare, making them easily accessible.

Life cycles of Microbracon brevicornis Wesm. and M. hebetor Say.--L. W. Noble, of Presidio, has been breeding *M. brevicornis* as a parasite of the pink bollworm. The original stock was imported from Europe and had been bred for a number of years on the European corn borer and for the last 2 years on pink bollworm. As this material had been bred continuously in the laboratory for several years, it was decided to import a stock of the pink bollworm parasite from Egypt to determine whether there were any notable biologic differences in the supposed two strains of the same species. Specimens of the Egyptian form received were submitted to C. F. W. Muesebeck, of the National Museum, for identification and were determined by him as *M. hebetor* and not *M. brevicornis*. *M. hebetor* is a normal parasite on insects attacking grain and other stored products. Before it was known that the material introduced from Egypt was *M. hebetor*, life-history studies under identical laboratory conditions were made. All the records were made on pink bollworm hosts, at a practically constant temperature of 78° F., and relative humidity of 65 percent. In *M. brevicornis* the average number of eggs deposited was 254, with a maximum of 610, whereas with *M. hebetor* the corresponding figures are 264 and 900. The average number of eggs deposited per day and the maximum were 12 and 36, respectively, for *M. brevicornis* and 16.6 and 39, respectively, for *M. hebetor*. It will be noted that these closely related species also have very similar life cycles, especially in the developmental periods of the immature stages. The greatest variations occur in the longevity and oviposition periods.

Hibernation of Microbracon mellitor at Tallulah, La.--J. W. Folsom reports that from 94 cocoons of *M. mellitor* spun in the fall of 1934 adults did not begin to emerge until March 16, 1935, indicating that the species normally hibernates in cocoons. However, the winter may also be passed in the adult stage, or under favorable conditions breeding may continue throughout the winter. One female that emerged on October 31, 1934, was kept alive until April 2, 1935, or 153 days. This female had not been mated. On January 15 she laid an egg on a boll weevil larva in a gelatine capsule punctured with holes. The adult, a male, issued on March 19. On January 18 she laid an egg on a larva of *Eurosta solidaginis* Fitch, taken from a gall on a goldenrod and placed in a similar capsule. The parasite larva became full grown but spun no cocoon. The pupa was seen on March 21, 22, and 23 and a male emerged on March 24. It should be said, however, that this long-lived female was protected against severe cold by being kept in a room at temperatures slightly warmer than those out of doors. There is no evidence as yet that M. mellitor hibernates as an adult at Tallulah, although it probably does so farther south.

Push-type cotton-stalk shaver.--D. A. Isler, of the Bureau of Agricultural Engineering, working in cooperation with the members of this Bureau's Presidio laboratory staff, has filed an application for a public patent on the push-type stalk shaver developed for cleaning fields for pink bollworm control. For more detailed reports on this implement see Bureau of Entomology News Letter, No. 236, p. 17 (January 1934), and Bureau of Entomology and Plant Quarantine News Letter, Vol. II, No. 1, p. 16 (January 1, 1935).

Notes on cotton flea hopper.--Hatching of cotton flea hoppers from overwintering eggs began at Port Lavaca, Tex., on February 19, according to K. P. Ewing and R. L. McGarr. The emergence was light, however, during February and early March with the peak of emergence occurring from April 6 to 8. Through April 38,595 nymphs emerged, as compared to 22,887 from similar cages last year. Croton plants collected last September averaged 251 nymphs per 100 plants, whereas those collected from October 6 to November 3 averaged 1,226 per 100 plants. Most of the common weeds found in the community were used for determining their importance as host plants for egg laying. The average emergence from these, per 100 plants, was as follows: Croton capitatus, 2,717 nymphs; C. texensis, 1,945; C. monothogynus, 243; bitterweed, 55; bloodweed, 39; cocklebur, 17; cotton, 10; other miscellaneous weeds (8 species), 0. Flight screens to determine migration of flea hoppers were placed in operation on April 16 and during the remainder of the month an average of 36.6 flea hoppers were caught per screen. The corresponding figures were 6.5 in 1934 and 102.5 in 1933. The croton clean-up campaign during the winter of 1933-34 may explain the small number of hoppers collected in April 1934. Screens facing in different directions caught the following comparative numbers: East, 157; south, 115; north, 85; and west, 83. On a screen placed on an elevated tower, 10 flea hoppers were taken at altitudes of 21 to 24 feet, as compared to 19 taken at elevations of 3 to 6 feet in the same location.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Trap-plot cotton in the Big Bend area of Texas.--Cold nights and high winds have retarded the growth of the trap-plot cotton throughout the month. In the Castolon district the weather was a little more favorable, and as a result the two plots there made very good growth. Both plots began putting on squares the latter part of the month, and apparently they will be blooming around the 20th or 25th of May. In the Presidio district the cotton did not grow so fast. By the end of April the larger plants were about 6 inches high and should begin squaring about the second week in May.

A considerable quantity of stub cotton came up in one of the fields at Castolon. This was all grubbed out, with the exception of some 50 stalks that will be used for trap plots. There was also some scattered stub cotton in the Presidio district, and this was grubbed out, with the exception of about half an acre on one farm, where from 150 to 200 stalks were left as a trap plot. Squares were found on these stubs the first of May. This plot is located in the most heavily infested section, and consequently should give some very good results. The delayed-planting date of April 15 for the Big Bend was satisfactorily observed and we also received excellent cooperation from the farmers on the Mexican side in observing this date. By the end of April most of the cotton crop had been planted in the Big Bend area from the mouth of the Conchos River southward. Above the Conchos there has been practically no planting on either the American or Mexican side of the Rio Grande, because of insufficient water for irrigating. However, it now appears that the trap-plot cotton has sufficient margin over the field cotton to give good results.

Pink bollworm control work in Florida.--Throughout the month of April two inspectors have been engaged in wild-cotton eradication on the west coast of Florida. These men have been removing seedling plants missed during the regular clean-up, and also removing the few scattered mature plants. A total of 56 mature, 3,515 seedling, and 44 sprout plants were removed. This work should prove of considerable value in preventing the fruiting of any plants before eradication work is resumed next season. Two other inspectors have been engaged in making a survey of the numerous keys which make up the Key West group, and they removed several small colonies found as a result of this survey. During the month between 250 and 300 keys were covered, and 150 mature and 399 seedling plants were removed. Many of the keys covered can now be eliminated from any further consideration, as they contain no high ground upon which wild cotton could grow. These men experienced considerable difficulty because of extreme shallow water in the area in which they were operating. They often had to pole their skiff 2 or 3 miles, when the water was too shallow to permit operating the outboard motor. Only 4 or 5 small colonies of wild cotton were found as a result of the survey.

Laboratory inspection.--Inspection at the various field stations continues to go forward satisfactorily. Only one specimen of the pink bollworm was found in the material inspected during April, this being in the Pecos Valley of New Mexico. The negative results in the Thurberia weevil area of Arizona are gratifying, as the previous month's inspection had indicated that there might possibly be a light infestation in the top crop of bolls over the area. The material inspected at the various stations had been collected within and at points just outside the regulated areas which would be most likely to show infestation.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Bean varieties approximately equal in susceptibility to spray injury, tests indicate.--R. W. Brubaker and N. F. Howard, of the Columbus, Ohio, laboratory, report that in tests conducted with 32 varieties of snap beans during the summer of 1934, spraying with magnesium arsenate and synthetic cryolite failed to disclose any appreciable differences in varietal susceptibility to injury by either of these insecticides. Incidentally, some of the varieties under observation were apparently much preferred to others by the Mexican bean beetle.

High concentration of anabasine sulphate gives fairly satisfactory results against squash bug.--H. C. Mason and R. W. Brubaker, Columbus, report that at a dilution of 1-100, anabasine sulphate (40 percent) killed a high percentage of adults and nymphs of the squash bug under both laboratory and field conditions. Under the latter, slight injury resulted to the margins of some of the squash leaves, but such injury was not serious. In combination with sulphonated oxidized gas oil (1-200), or miscible pine oil at the same dilution, the growing tips of the squash vines were seriously injured. The percentage of kill obtained with anabasine sulphate alone at the dilution of 1-200 was unsatisfactory and a dilution of 1-400 gave practically no kill. Powdered soap at the rate of 1 pound to 50 gallons of water, in combination with anabasine sulphate at any dilution, although tested only under laboratory conditions, greatly increased the percentage of kill.

Derris dusts economical in controlling Mexican bean beetle in Virginia.--L. W. Brannon, of the Norfolk, Va., laboratory, reports that in general the increases in yield of beans per acre due to treatment and the net profits per acre were greater as a result of the dust treatments than with the spray treatments, even though the cost of the dust applications was considerably greater than that of the spray. The plots treated with derris dusts gave such large increases in yield that derris was more economical in the end than some of the cheaper materials. The net profit from the use of cryolite (sodium fluoaluminate) was greater than from the derris-root spray, owing to the low cost of the former. The general results of the experiment demonstrated that a derris-root dust mixture containing 0.75 percent rotenone, with talc as a diluent, was highly effective in controlling the Mexican bean beetle, and that this dust mixture could be used profitably on snap beans bringing as low as 45 cents per bushel.

Oil sprays effective against rhododendron white fly.--Randall Latta, of the Sumner, Wash., laboratory, continuing his studies with the white fly Dialeurodes chittendeni Laing, on the basis of final observations on sprays applied January 31, February 11, and February 26, 1935, respectively, reports as follows: "It was possible to make final observations on sprays applied on these dates. As noted in previous reports, three oils were used--a dormant oil of 74-76 sulphonation and 100-110 viscosity, a heavy oil of 94 sulphonation and 90-100 viscosity, and a commercial oil emulsion, specifications unknown. These were emulsified by the casein-ammonia method. The counts which are given below were all made on April 26. The mortality following application of the spray is shown below.

Oil	Date	Dilution	Total		Average mortality
			Dead	Alive	
		Percent	Number	Number	Percent
Dormant	Jan. 31 A	1	356	63	84.9
Heavy	do.	1	337	12	96.5
Dormant	Jan. 31 B	1	46	0	100.0
Heavy	do.	1	69	3	95.8
Commercial emulsion	Feb. 11	1+	180	9	95.2
Heavy	Feb. 26	2	420	0	100.0
Commercial emulsion	do.	1+	1,392	196	92.9

"These results show favorable control from the use of oil sprays. The figures are consistent with those given in the previous report."

Naphthalene-treated gladiolus corms lose less weight in storage than do untreated corms.--R. H. Nelson, of the greenhouse-insects laboratory, Washington, D. C., continuing his tests on the control of gladiolus thrips in further experiments with gladiolus corms, both in warm and in cool storage, states that corms treated with naphthalene did not lose as much weight as did untreated corms, also that the corms in warm storage lost more weight than did those in cool storage. This was true even after the naphthalene had been removed. The difference was not great, and the significance is doubtful, but it indicates a continual reduction in the physiological activity of the corms from exposure to the naphthalene.

Mites killed by hot-water treatment.--F. F. Smith, of the greenhouse-insects laboratory, Washington, in two preliminary tests conducted in cooperation with W. H. Larrimer, of the Division of Cereal and Forage Insects, reports that the following minimum hot-water treatments killed the Tarsonemus bancrofti Michael on from one to five leaf sheaths on the canes: 30 minutes immersion at 110° F.; 30 minutes immersion at 115°; 15 minutes immersion at 120°. T. randsi n. sp., which was present among the colonies of T. bancrofti, was much more resistant than T. bancrofti, requiring the following temperatures and durations to effect complete mortality: 60 minutes at 110° F.; 30 minutes at 115°(under one sheath T. bancrofti was killed by a 15-minute immersion); and 10 minutes at 120°(T. bancrofti was killed under one sheath).

INSECTS AFFECTING MAN AND ANIMALS

Longevity of unfed larvae of the winter tick and oviposition.--At Ames, Iowa, it has been found that 100 percent of several hundred unfed seed ticks of Dermacentor albipictus Pack., kept in an insectary without artificial heat, were still alive after a period of 298 days, but that all except about 1 percent died after 328 days. Engorged females removed from horses on January 1 at Sonora, Tex., and kept at a room temperature which never dropped below 40° F. began laying eggs on March 27 and the eggs began hatching May 2. Females obtained from the same hosts at the same time, but kept in an open insectary where the temperature reached a minimum of 10° F., did not begin oviposition until April 10. The eggs had not yet hatched on May 2.

Imported blowfly parasite apparently established in Texas.--Attempts at Uvalde, Tex., for the past few years to establish Alysia ridibunda Say, a native hymenopterous parasite, have apparently been successful. These insects, which attack the larvae of blowflies breeding in carcasses, were able to pass the winter in the Uvalde locality and have been recovered this spring in from 30 to 50 percent of the meat baits used for this purpose. Since September 1, 1934, 32,824 of this species have been liberated.

Conference on malaria and mosquito-control problems.--E. L. Bishop, director of health and sanitation of the Tennessee Valley Authority, called a meeting of the advisory committee to discuss malaria and Anopheles mosquito control in the areas affected in connection with the power projects to be developed by impounding the Tennessee River. The members of the advisory committee are M. F. Boyd, of the Rockefeller Foundation, T. H. D. Griffitts and J. A. LePrince, of the United States Public Health Service, and W. V. King, of this Bureau. The meeting was held at Sheffield, Ala., on April 25 to 27. The control areas under consideration are the present Wilson Lake, Wheeler Lake now under construction, the Pickwick Landing project, which is not started but is planned for completion in 1938, and the Norris Dam area. The total area in these four projects to be covered by the impounded water will amount to considerably over 124,000 acres and will have a total shore line of about 2,600 miles. Systematic malaria and mosquito surveys, the use of airplanes and boats for the application of larvicides, a house-screening program, and the distribution of free medicine are among the several methods to be employed to prevent malaria in the affected localities.

FOREIGN PARASITE INTRODUCTION

Recent importations from the European parasite laboratory at Hyeres, France, include Trichacis remulus Walker, parasitic in the larvae of the Hessian fly; Bathyplectes corvina (Thoms.), a larval parasite of the alfalfa weevil; and a small consignment of Tetrastichus xanthomeleanae Marchal, an egg parasite of the leaf beetle.

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Two living larvae of the Mediterranean fruit fly were intercepted last November at New York in an orange in stores from Portugal. Living adults of Xylothrips flavipes Ill. were taken at San Francisco in logs of Philippine mahogany in cargo from the Philippines. The bostrichids were boring in the heart wood. Living larvae of the elaterid Melanotus rufipes Hbst. were found last January at Washington, D. C., with packing around Helleborus plants in the mail from England. Kuwanina parvus (Mask.) arrived on March 15, 1934, at Honolulu, Hawaii, on a cherry tree in cargo from Japan. This is the first interception record of this coccid in our files. Adults of the chrysomelid Phyllotreta *cruciferae* Goeze were taken in ship's stores from Europe on two occasions in 1934--at Philadelphia on a leek (*Allium porrum*) from France, and at New York with cabbage from England. Living and dead adults of the weevil *Apion cerdo* Gerst. were intercepted last November at Washington, D. C., in seed of *Vicia* sp. in the express from Issyk Kul, U. S. S. R. This species was taken at Washington, D. C., in 1930 with vetch seed from Spain. The leaf beetle *Metaxyonycha panamensis* Jacoby was found at San Pedro, Calif., with bananas in cargo from Panama. Fourteen living larvae of *Psylliodes chrysocephala* L. arrived last January at New York in the roots and stems of turnips in stores from France. Four nymphs, apparently of *Megophthalmus scanius* Fall., were taken at Baltimore with shamrocks in the mail from Ireland. Living larvae of the West Indian sweetpotato weevil (*Euscepes batatae* Waterh.) were intercepted at Mobile, Ala., in sweetpotatoes in stores from Aruba, Dutch West Indies. A living specimen of *Mecistorhinus tripterus* Fab. arrived at Charleston, S. C., with banana debris in cargo from Honduras. Five living adults of *Platypus lucasi* Chapu. were intercepted at Seattle, Wash., in logs in cargo from the Philippines. This species is not recorded from the continental United States.

Pathological interceptions of interest.--*Arthrobotrys superba* Cda. was intercepted on March 11 on *Ficus* sp. from Barbados, British West Indies, at New York (first interception). *Bremia lactucae* E. Regel was intercepted on February 14 on lettuce from France at New York. The only previous interception of this disease was made last year, same host, origin, month, and port. *Colletotrichum atramentarium* (Berk. and Br.) Taub. was intercepted at New Orleans on April 8 on eggplant (first interception from Argentina). *Colletotrichum omnivorum* Hals. was intercepted from Germany on March 4 at New York on *Aspidistra* sp. (first interception from Europe). *Colletotrichum peregrinum* Pass. was intercepted at Seattle on February 19 on *Fatsia japonica* from Japan (first interception). *Coryneum* sp. (perhaps *C. rhododendri* Schw.) was intercepted on *Rhododendron* sp. from England on March 18 at Seattle (first interception of *Coryneum* on rhododendron). *Discosia artocreas* (Tode) Fr. was intercepted at Seattle on peony from Japan on November 13, 1934 (first interception). *Gloeosporium pelargonii* Cke. and Mass. was intercepted at New York on February 18 on a geranium from Puerto Rico (first interception). *Gloeosporium sansevieriae* Verwoerd and Duplessis was intercepted on sansevieria from Puerto Rico on February 4 at New York (first interception). *Gloeosporium* sp., unlike any species described as occurring on *Camellia*, was intercepted at Seattle on March 5 on *Camellia japonica* from Japan. *Glomerella cingulata* (Ston.) Spauld. and Schrenk was intercepted for the first time on papaya from Panama on March 27, at New York. *Heterosporium* sp. (probably *H. gracile* Sacc.) was intercepted at Seattle on March 18 on *Schizostylis* sp. from England. *Leptosphaeria* sp. (no species is reported on wistaria) and *Microdiplodia wistariae* Grove (only one previous interception) were found on *Wistaria multijuga* from Japan on March 18 at Seattle. *Macrophoma* sp. (perhaps *M. aucubana* Sacc. but spores longer than in description) was intercepted at Seattle on February 20 on *Aucuba japonica* from Italy. *Mycosphaerella schoenoprasi* (Rabenh.) Schroet. was intercepted on April 11 at Philadelphia on leeks (first interception from Spain). *Pestalozzia* sp. (none found reported on wistaria) was intercepted on March 18 at Seattle on *Wistaria multijuga* from

Japan. *Phoma betae* (Oud.) Frank was intercepted at Philadelphia on April 10 on chard from Italy (first interception from Italy) and on April 16 on beets from Chosen (first interception from Asia). *Phoma sanguinolenta* Rostrup was intercepted on April 1 at Port Arthur on carrots from France (first interception). *Phomopsis* sp. (no species reported on *Coelogyne*) was intercepted on March 6 at New York on *Coelogyne dayana* from Jamaica. What appeared to be *Phyllosticta pisi* West was found on peas infected with *Mycosphaerella pinodes* (Berk. and Blox.) R. E. Stone intercepted at New York on April 17 on peas from France. The material was insufficient for study. *Phyllosticta* sp. (somewhat similar to *P. cucurbitacearum* Sacc.) was intercepted at New York on February 6 on cucumbers from Cuba (first interception of a *Phyllosticta* on this host). *Plasmopara viticola* (Berk. and Curt.) Berl. and De Toni was intercepted on grapes from Argentina on March 22 at New York (first interception from Argentina). *Pseudopeziza medicaginis* (Lib.) Sacc. was intercepted on alfalfa found in boxes of pears from Argentina on February 25 at New York (first interception positively identified). The same fungus was found on shamrocks from Ireland intercepted at New York on March 13. *Pyrenophora ciliolata* Moesz. was intercepted on March 18 at Seattle on *Primula facchinii* from England (first interception of the genus). *Sclerotium oryzae* Catt. was found on several lots of rice straw from Spain used as packing in cargo reaching New York on February 1 and 26. This disease has been intercepted before but this is the first time it has been possible to get it determined. *Scoleconectria* sp. and *Tetracium* sp. were intercepted on March 15 at New York on citrus leaves from Brazil (first interceptions of these genera). *Septoria endiviae* Thuem. was intercepted at New York on April 12 on chicory from Italy (first interception). *Septoria* sp. (different from species described on primulas) was intercepted on March 18 at Seattle on *Primula salisburgensis* from England.

Areca diseases.--Diseased fruits of *Areca catechu* from the Philippines found in baggage at Seattle on February 19 were infected with *Gloeosporium catechu* Syd. (first interception), another species of *Gloeosporium* with spores much smaller than any species found described on *Areca*, and *Macrophomella* sp. (possibly same as *M. pandani* Died. on fruits of pandanus but has larger spores). This is the first interception of the genus *Macrophomella*. *Areca catechu* is the source of "betel nuts", chewed by the natives in tropical countries, as well as of a dye and medicines.

New species of nema intercepted.--On April 15 an inspector at Boston found a diseased yam from Port Harcourt, Nigeria, in a liquor locker in the crew's quarters of a vessel. Examination in Washington disclosed the presence of numerous parasitic nemas in the brown lesions. This nema is an undescribed species of *Hoplolaimus*. It will be recalled that *Hoplolaimus bradys* was described from a yam intercepted from Jamaica. According to Dr. Steiner members of this genus appear to be parasitic in the roots of a number of plants in Africa. On April 17 an inspector at New Orleans found a diseased potato from Cuba in stores. Examination in Washington disclosed an interesting array of nemas which have been determined as *Aphelenchoides* n. sp. (apparently the primary cause of the disease), *Cephalobus* n. sp., and *Anguillulina* sp.

Pink bollworm in cotton from Mexico.--Fifty-five locks of seed cotton were taken from a truck crossing the border from Mexico at Presidio, Tex., on April 16. Examination determined that it was infested. The search was short as the first four locks yielded one live and one dead pink bollworm. The entire lot was forthwith destroyed.

Mediterranean fruit fly intercepted from Palestine.--Although Ceratitis capitata Wied. has long been known to occur in Palestine, it was found for the first time in the course of port inspection in any host fruit from that countr on March 7 at New York, when three living and seven dead larvae were discovered in 2 oranges of a sample taken for examination from a lot of eight cases (880 fruits) in ships' stores.

Clove-stuffed oranges.--Europeans sometimes stick cloves thickly all over a fresh orange and after it has dried out it is placed in a trunk or drawer to diffuse the agreeable combination of clove-and-orange aroma among the contents. Recently several commercial shipments of these clove-studded oranges have been made from England, the fruit being presumably of Spanish origin. When thoroughly dried out, the finished product is regarded as without risk of harboring fruit fly larvae, but some of these shipments have arrived in this country in an imperfectly dried condition and their entry had to be refused.

DOMESTIC PLANT QUARANTINES

White pine blister rust quarantine amended.--The State of Minnesota recently placed a regulation setting aside certain areas for the production of five-leafed pines within which no currant or gooseberry plants may be grown. Federal quarantine no. 63 was accordingly amended, effective March 15, requiring shippers to secure a permit before shipping Ribes plants to Minnesota or to the nine other States maintaining similar control areas.

Citrus canker in new location.--Recent inspections in the vicinity of Alvin, Tex., have resulted in locating citrus canker on 8properties. Four of these showed old infections on Citrus trifoliata and were found in an area from which no citrus canker has recently been reported. During the winter and spring inspections, carried on cooperatively with the Texas Department of Agriculture, over 20 infected properties have been located in the Galveston-Brazoria area. Infections were found on Citrus trifoliata growing in abandoned orchards and woodlands. All infected trees, and in most instances all other Citrus trifoliata trees growing on the property, were destroyed.

Inspection for phony peach disease.--Inspection was begun on April 16, field experiments having indicated that conditions were satisfactory for active work. Inspections have been made thus far in four counties in Georgia. The removal of diseased trees early in the season eliminates the cost of caring for worthless trees and is indorsed by the growers, who are furnishing more labor for tree removal than in previous seasons.

Summary of narcissus inspection.--A record of the inspection in the various States during the calendar year 1934 has been summarized and published as B. E. P. Q. circular 373, dated April 23, 1935. The figures were taken from the reports sent to this Bureau by the nursery inspectors of the various States who acted as Federal collaborators in such inspections.

State action on narcissus.--The Oregon Department of Agriculture placed a quarantine on April 8, requiring as a condition of entry of narcissus bulbs, certification based on two inspections during the season and on hot-water treatment for infestation. Word has been received that in Florida, Virginia, and Michigan inspections will be made the same as when the Federal quarantine was in force and that in Maryland and Pennsylvania the inspection of narcissus plantings will be continued as part of the general nursery-inspection program. An unconfirmed report states that the Texas Department of Agriculture has placed special regulations with reference to narcissus bulb shipments.

BEE CULTURE

Pollen reserves in Colorado.--C. L. Farrar, of the Intermountain States Bee Culture Field Laboratory, Laramie, Wyo., assisted by R. G. Richmond, deputy State entomologist of Colorado, reports results of the pollen-reserve surveys in apiaries of two commercial beekeepers in the vicinities of Greeley and Brush, Colo. The colonies of the combined apiaries totaled 2,500. Two hundred and twenty-nine colonies in 6 yards were examined for pollen reserves in September 1934 (see December 1, 1934, News Letter) and were again checked for general conditions in April 1935. The average reserve pollen per colony ranged from 89 to 334 square inches of cells containing pollen in the colonies of the 6 yards in September 1934. The pollen variation between colonies ranged from practically none to over 350 square inches in 5 of the 6 yards; 51.2 percent of all colonies examined in April 1935 showed a general condition directly in proportion to the amount of reserve pollen present in the fall; 18.5 percent were grouped as border-line cases; 17.6 percent showed a general condition inversely related to the pollen reserves; 6.5 percent were evidently abnormal colonies, resulting from excessive drifting; 6 percent were queenless; and 5 colonies were dead and were therefore not considered in determining the percentages. Drifting between all colonies is an important factor affecting colony conditions in all commercial apiaries. It is considered significant that from 51.2 to 69.7 percent of the colonies showed a general condition trend in line with experimental results covering three seasons on controlled isolated colonies whose surviving populations in the spring, as compared with equivalent colonies, are directly proportional to the amount of pollen in reserve the previous fall. The experiments showed that the average reserve pollen per colony in the region in question is below the optimum requirement. Any method of management designed to increase the reserves should be beneficial to efficient management of overwintered colonies.

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

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FRUIT INSECT INVESTIGATIONS

Number of Angoumois grain moth eggs needed to start rearing cabinets for Trichogramma work.--Herbert Spencer, of the Albany, Ga., laboratory, has recently made a study of the number of *Sitotroga* eggs needed for a quick start in grain cabinets in preparation for mass rearing of *Trichogramma*. On January 16, two cabinets were filled with frames of grain in the usual manner, and in one 2,400,000 *Sitotroga* eggs were placed, half on the date stated and the other half 2 weeks later. In the other cabinet 4,800,000 eggs were placed in the same manner and on the same days. As soon as the moths became numerous enough they were collected separately from each cabinet every day and records were kept of the egg yields. It has been concluded from the results obtained thus far that 2,400,000 eggs is a more economical number to use in starting a cabinet than twice that number, and that a cabinet may be brought into full production in 35 days.

Emergence of Blastophaga psenes (L.).--New data on the caprifying insect was obtained by H. C. Donohoe, of the dried-fruit insect laboratory at Fresno, Calif., who recorded emergence by sexes from 4 lots of 15 caprifigs each. The caprifigs were of the mamme or overwintering crop, variety Roeding No. 3. Production of females averaged from 114 to 192 per fig and males emerged at an average rate of from 34 to 74 per fig. The records obtained indicate that, in approximate figures, each male made openings in 3 galls and fertilized 3 females.

MEXICAN FRUIT FLY CONTROL

Activities in May.--During the month the inspectors' time has been given to trapping, to collecting wild fruits and berries that might be hosts of any species of *Anastrepha*, and to checking groves for any fruits missed during the clean-up. Traps in operation totaled 8,816. There were 32,256 trap inspections made and 581 premises trapped. Adult *A. ludens* Loew trapped in the lower Rio Grande Valley area totaled 23. Three *A. ludens* were trapped in Laredo, 5 in Matamoros, and 1 in Reynosa. Four *A. serpentina* and 1 *A.* sp. "*X*" were trapped in May. This is the first time the two last-named species have been taken since January.

DATE SCALE CONTROL

Recess in date scale clean-up.--With the advent of hot weather, clean-up work was discontinued until fall. The greater part of the clean-up work was done in 1929 and 1930, when thousands of palms in abandoned seedling plantings were dug out and destroyed and many more were pruned so that they could be inspected properly. There remained many palms difficult to inspect which, although of no immediate concern, might later develop infestations that would result in spread. These palms have been pruned or dug out during the course of the work by the inspection crew at times when inspection could not be made satisfactorily because of wind or other unfavorable weather conditions. This type of work has been completed in Arizona and little remains to be done in California. An inspection from ground and ladders of the infested block in the Reed Garden in the Imperial Valley and of all ornamental palms within a 2-mile radius of the Reed Garden was completed and no scale was found. Pruning and inspection from ground and ladders, with the exception of a small block of tall palms in the Middleton planting, has been completed in the Webb subdivision. Ground inspection was carried on in the Yuma area and no scale was found.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Hairy vetch Bruchus in the Carolinas.--J. S. Pinckney reports as follows: "In North Carolina Bruchus brachialis Fahr. begins emerging from hibernation the latter part of April. One adult was taken by sweeping on April 23, 1935. On May 14 this field was again visited and many adults were found. At this time volunteer vetch was beginning to develop pods, although cultivated vetch had not yet begun to produce them. The adults were active, flying about the vines and climbing over the blossoms in search of pods on which to oviposit. Results of an egg count on May 14 on 25 pods taken at random from volunteer vetch were as follows: Pods infested, 11; number of eggs, 20; maximum number of eggs on 1 pod, 4. The first hatched eggs were found in the field on May 20. As the length of the incubation period of the egg ranges from 5 to 11 days in the field, this would indicate that egg deposition was started in the first week of May. On June 8 eggs were still being laid, although the peak of deposition was reached in the last week of May. Of 50 pods examined on May 25, 45 were infested with 804 eggs, with a maximum of 42 eggs on 1 pod. Altogether 1,275 pods were examined, of which 1,024 were found infested, with a total of 7,314 eggs. Hatching was taking place extensively on June 8 and young larvae were entering the seed in large numbers. As many as 6 entrance holes have been observed in 1 seed. The larva enters the seed at any point, but the greatest number enter at the hilum or close to it."

Parasite fails to hibernate in eggs of velvetbean caterpillar.--G. W. Barber, New Haven, Conn., reports as follows: "During the month of October 1934 Anticarsia gemmatilis Hbn. had become very abundant in a late-planted field of soybeans in Washington County, Ga., and the larvae were defoliating plants in parts of the field. About the second week of October, however, Trichogramma minutum Riley had become abundant and prevented further damage. A large proportion of Anticarsia eggs deposited after October 15 were parasitized and by October 31, when the soybean leaves were falling, almost every leaf bore from one to several parasitized eggs. Examinations of the eggs borne by the soybean leaves showed that all of the parasites emerged during the warm days of November. It was also apparent that the adults of T. minutum were not hibernating in the soybean hay or crop remnants."

Straw worm infestation reduced in early variety of wheat at Birds Landing, Calif.--W. B. Cartwright, of the Sacramento, Calif., laboratory, reports as follows: "At the time of maximum flight of the summer generation of the wheat straw worm (Harmolita grandis Riley) on April 24, a variety of wheat called Sunset was fully headed and its culms were either maturing rapidly or were dead. The straw worm infestation in this wheat reached a low, for the wheat nursery, with 60 percent of the plants infested and a population of 88 larvae per 100 plants. For comparison, Bunyip, a variety about 2 weeks later in heading, had a 100-percent infestation of the plants and a population of 340 larvae per 100 plants. In contrast with this imperfect synchronization of plant growth and straw worm activity, Sunset was most receptive to attack by the wheat joint worm (Harmolita tritici Fitch), receiving a 72-percent plant infestation, as compared to no infestation in a late variety. The joint worm migration was computed to have occurred near the middle of April and about at the heading period of Sunset. Past observations have indicated only meager infestations in wheat varieties at Birds Landing, Sunset being the notable exception and the earliest maturing variety yet tested. Bunyip ranks next for joint worm infestation and likewise is second in earliness. Sunset was acceptable to the hessian fly emerging in March but was not acceptable to the supplementary generation in May. Bunyip was infested by both broods."

Wheat-rye hybrid not infested by straw worm or joint worm.--Mr. Cartwright also states that when grown under conditions favorable for high infestations of straw worm and joint worm, an amphidiploid wheat-rye hybrid remained uninfested in the nursery in 1935 at Birds Landing. It was 100 percent infested with hessian fly.

Grasshopper outbreak in San Luis Obispo County, Calif.--C. C. Wilson, Sacramento, reports: "The outbreak of the warrior grasshopper (Camnula pellucida Scudd.) and the valley grasshopper (Oedaleonotus enigma Scudd.), which extends over a 100-mile front, is well under control. More than 50 tons of bran bait has been used in an effort to prevent widespread migration into cultivated crops. Damage to grazing land has been severe, especially to areas adjacent to the egg beds of the warrior grasshopper. Bur clover and filaree have been severely damaged, the former being completely defoliated and the latter cut off by the grasshoppers at the nodes near the ground. Threatened damage to thousands of acres of beans is being stopped by the application of poisoned bait in adjacent areas. Approximately 40 S. E. R. A. men are assisting the ranchers in this work, under the direction of the agricultural commissioner, in an effort to reduce the grasshopper population to a point that will prevent such outbreaks for a number of years. This (1935) is the third successive year of grasshopper damage and, apparently, carries the heaviest population."

Effects of early cutting on alfalfa weevil.--Geo. I. Reeves, Salt Lake City, Utah, reports that an experiment to prevent weevil injury by clipping the first crop 2 weeks before the usual cutting time was carried out by the Bureau in cooperation with County Agent Fowler and The Rogue River Company at Medford, Oreg. An extraordinary kill of eggs and younger larvae was obtained. The practical results have not yet been ascertained.

Correction.--On page 4 of the June 1, 1935, News Letter (vol. 2, no. 6), in line 27 under the heading "Nemic parasite of corn ear worm discovered", "alfalfa weevil" should read "clover leaf weevil."

JAPANESE AND ASIATIC BEETLE INVESTIGATIONS

Bacterial diseases among Japanese beetle larvae.--In connection with the studies of soil organisms attacking immature stages of the Japanese beetle, I. M. Hawley and S. R. Dutky, Moorestown, N. J., found that dead and diseased larvae found during the month of May at Haddonfield, N. J., constituted 12.8 percent of the total larvae in the surveyed area. A large percentage of the diseased larvae showed the muddy brown color characteristic of one type of disease found heretofore. Larvae affected by this disease turn a muddy brown color while they are still alive and active. Microscopic examinations showed the blood of these larvae to be loaded with bacterial spores. Attempts to culture the organism have so far been unsuccessful. Healthy larvae given injections of blood of diseased larvae did not turn the characteristic brown but a milky-white, condition very closely resembling the "milky" disease which has been previously reported. The two diseases, while very similar, are not believed to be identical, because of the decided morphological differences in the sporangia of the causal organisms.

Stickers and spreaders for derris.--L. D. Goodhue, Moorestown, reporting on this work, gives in the following table the results of some new stickers tested on glass plates. The amount removed by washing was determined by weight. A 2-percent suspension with 1-percent sticker was used, except as indicated with the last combination.

Sticker	Percentage removed by washing
Sticky resin	5.6
Rosin residue, Type II	7.5
Rosin residue, Type I	7.5, 10.2
Rosin residue, Type III	8.5
Skimmed milk powder	82.5
Calcium carbonate, 2 percent Aluminum sulphate, 1 percent	97.8, 96.0

Type I rosin residue was tested at one-fourth the concentration of derris, and 13.8 percent was lost. This is a very effective sticker even at this low concentration.

Prevention of decomposition of derris by light.--Reporting further on the decomposition of derris, L. D. Goodhue gives in the following table the results of some new materials with additional tests on old ones as stabilizers for derris. Deposits on the glass plates have been examined under the microscope in an effort to explain the good results obtained with white pyroxylin enamel. With other substances a large part of the derris still remained exposed, while with white enamel nearly every particle was well coated. The enamel coated the derris more readily than the glass plate. The physical properties of this material during spraying and drying appear to be the explanation of the good results obtained.

Material added to derris	Percentage added [1]	Sticker [2]	Ratio of undecomposed derris to a mixture of derris and fish oil in	
			5 days	10 days
White pyroxylin enamel-	100	Pyroxylin	2.6	4.5
Titanium dioxide--------	100	Irish moss	2.3	1.2
Magnesium silicate-----	400	do.	2.1	1.3
Do-------------	200	do.	2.0	1.3
None------------------	0	None	2.0	1.6
Do------------------	0	Rosin residue III	2.0	1.6
Do------------------	0	Rosin residue II	1.9	1.5
Do------------------	0	None	1.9	1.8
Do------------------	0	Rosin residue I	1.7	1.8
Sulphur----------------	50	Casein	1.6	1.4
Whiting----------------	200	Irish moss	1.6	1.2
Bentonite--------------	50	Casein	1.5	1.0
Titanium dioxide--------	100	Rosin residue I	1.5	---
Magnesium phosphate----	100	None	1.2	1.3
Calcium carbonate------	100	Rosin residue III	1.1	1.0
Calcium carbonate------- Aluminum sulphate------	100) 25)	None	0.5	0.27

[1] Based on the amount of derris.

[2] Approximately 50 percent of weight of derris.

On the basis of these and similar tests, blown fish oil has been discarded and Type I rosin residue substituted as a sticker for derris to be tested in the field this season. Type I was chosen because of its lower viscosity which allows it to be more easily emulsified.

Protection of truck crops from injury by Japanese beetle larvae.--Tests were undertaken by F. E. Baker, Moorestown, to determine the effectiveness of a Danish roto-cultivator in reducing larval populations in the soil. A pasture in Shiloh, N. J., having a high concentration of larvae that were fairly uniformly distributed, was selected for the tests. Each trial was conducted on a 10-foot strip the entire length of the field, which was approximately 500 feet long. Preliminary surveys were made on 1 percent of the area by surveying 1 square foot every 10 feet, and the final surveys after plowing were made between the originals. The effectiveness of the Danish roto-cultivator in reducing larval infestations, as shown in the test runs made, is summarized in the following table:

Runs 3 inches deep	Runs 6 inches deep	Average larval infestation per square foot	Average survival per square foot	Survival
Number	Number			Percent
--	1	25.10 ± 1.95	7.66 ± 0.49	30.5 ± 3.1
--	2	29.44 ± 1.23	5.20 ± 0.37	17.7 ± 1.5
--	3	33.62 ± 1.85	2.02 ± 0.21	6.0 ± 0.7
1	1	30.70 ± 1.59	3.54 ± 0.50	11.5 ± 1.7
2	1	29.60 ± 1.78	2.40 ± 0.24	8.1 ± 0.9

It can be shown by statistics that running the machine twice over the same strip caused a significant decrease over 1 run, and the same decrease was true of 3 runs over 2 when the rotor was so set as to reach a depth of 6 inches in each case. In the same manner it can be shown that 1 plowing 3 inches deep followed by 1 plowing 6 inches deep gave a significantly greater reduction than did 2 plowings 6 inches deep. However, this reduction was still significantly less than was obtained from 3 plowings 6 inches deep. Although 2 plowings 3 inches deep followed by 1 plowing 6 inches deep apparently did not obtain quite as great a reduction as 3 plowings 6 inches deep, there was really no significant difference between the two. In order to compare the reductions attained with a rotary machine with those to be expected in the ordinary manner of preparing land for planting, 3 more tests were undertaken with a mold-board plow and a double disk. The effectiveness of the mold-board plow and the double disk in reducing larval infestations as shown in these tests is summarized in the following table.

Plowings 6-7 inches	Diskings	Average larval infestation per square foot	Average survival per square foot	Survival
Number	Number			Percent
1	1	24.74 ± 1.69	18.48 ± 1.39	74.7 ± 7.6
1	2	23.44 ± 1.61	16.18 ± 1.47	69.0 ± 7.9
1	3	23.84 ± 1.33	17.16 ± 1.09	72.0 ± 6.1

There was no significant difference between any of the tests made, showing that any disking immediately after plowing was of no value in reducing infestations of larvae at this time of year, when they are concentrated in the upper 2 inches in sod land. An average reduction of approximately 28 percent was obtained by the plowing. However, these tests definitely show how much more valuable rotary-type plows are than ordinary mold-board plows in reducing larval infestations.

Occurrence of Tiphia vernalis Rohw., an imported parasite of the Japanese beetle.--T. R. Gardner, Moorestown, reports that the first appearance of *T. vernalis* in the field was observed on May 7, when both males and females were found at the Philmont colony site at Philadelphia, Pa. Owing to the cold, wet weather early in May, this species was apparently retarded. Collections of adult females for colonization were not started until May 14 and were continued through May 24. During this period collections were made on 8 days. Collections were made from restricted points at well-established colonies located on the Philmont, Overbrook, and Roxborough golf courses. Two men were employed in collecting at Philmont; one man at Overbrook, except the last 2 days when two men were employed; and one man at Roxborough. During this 8-day period a total of 13,975 females were collected, divided as follows: Philmont, 8,506; Overbrook, 2,867; and Roxborough, 2,602. The total time spent in collecting was 188 man-hours, giving an average of nearly 75 females per hour per man, although at times when weather and temperature conditions were ideal one man collected 5 females per minute from one tree. When collections ceased on May 24, adult females were still abundant at the three collection centers and thousands more could have been collected. With this collected material, 133 colonies, each consisting of 100 females, have been placed in the field in the heavily infested areas in New Jersey, Pennsylvania, and Delaware by M. H. Brunson and R. T. White.

JAPANESE BEETLE CONTROL

Trapping started in St. Louis, Mo., and in the Carolinas.--Placing of Japanese beetle traps in St. Louis as a special E. R. A. project was begun on May 17. Traps set by the end of May numbered 2,500. With the dispatch to North and South Carolina of four trap-distributing crews from the New Cumberland, Pa., warehouse on May 29, the first field operations in connection with this season's trap-scouting program in the South were started. Eight trucks were loaded with 13,000 scouting-type traps to be used in the Carolinas. These are the first of the collapsible tin-plate traps to be set in the field. Under greatly modified specifications, it was possible this year to purchase geraniol at $0.54 per pound, as compared with previous purchases at approximately $1.50 per pound.

Grubs intercepted at road-patrol stations.--From the soil about the roots of contraband plant material surrendered at the road-inspection stations during May there were removed 45 Japanese beetle larvae. Among the most important infested shipments intercepted was a hydrangea plant en route from Washington, D. C., to Berryville, Va. Six larvae were found in the soil accompanying this plant. Five larvae were removed from the soil around the roots of 5 phlox plants obtained in Wilmington, Del., and destined to Greenville, S. C. A balled and burlapped dogwood tree originally obtained in Shiloh, N. J., and being transported by a motorist to Youngstown, Ohio, was found to be infested with 4 grubs. A south-bound motorist from Philadelphia, Pa., surrendered at the Fredericksburg, Va., station 2 peony plants that contained 3 larvae. Four grubs were found in the examination of soil accompanying a rose bush and 2 chrysanthemum plants obtained in Delaware City, Del., in the possession of a motorist bound for West Palm Beach, Fla.

In addition, 17 other infested lots of plants were stopped while on their way to various nonregulated points in West Virginia, Virginia, North and South Carolina, Tennessee, Georgia, Florida, Pennsylvania, Michigan, Minnesota, and Missouri.

Gypsy moth egg clusters removed from inspected commodities.--Products found infested in the course of the month's inspections included 300 cedar poles shipped by boat from Wickford, R. I., to New Haven, Conn. The inspector located and creosoted 25 egg clusters on these poles. While inspecting 4 spruce trees at a nursery near Framingham, Mass., 3 egg masses were found. Single egg clusters were removed from an azalea for shipment from Sandwich, Mass., to Evanston, Ill., and from a hemlock tree certified at a Westfield, Mass., nursery; and 75 egg clusters were found on 2 carloads of lumber presented for inspection and certification at Wescott, Maine, for shipment to Brooklyn, N. Y. Although the lumber was inspected from May 24 to 27, only 1 egg cluster had started to hatch. Four egg clusters were found on a carload of lumber destined from Meredith, N. H., to Brooklyn, N. Y.

Dutch elm disease activities halted.--With the practical exhaustion of the P. W. A. allotment of $527,000 for the sanitation project of the eradication program and in the absence of an anticipated further allotment from work relief funds, it was necessary on May 10 to dismiss all P. W. A. workers engaged in scouting and eradication. With elms just coming into full leaf the middle of May, the most desirable period of the year for observing conspicuous wilting caused by disease infection was approaching. Emergence of Hylurgopinus rufipes Eich. was reported on April 24, and Scolytus multistriatus Marsh. beetles were observed emerging on May 10. Except for 36 crews placed on the New York State payroll for 10 days beginning May 25 and 152 C. C. C. workers operating in the New Jersey area, the latter part of the month was one of complete inactivity insofar as elm eradication was concerned.

Summer symptoms of Dutch elm disease appear.--Culturing of samples collected from an elm in the Bronx, which on May 16 first evidenced characteristic wilting, resulted in confirmation of the infection as Dutch elm disease. Another tree some blocks from the first tree discovered was also confirmed as similarly infected. Four days after discovery of the first tree, wilting had progressed to practically all foliage and by June 1 wilting was complete. On June 1 six additional wilted elms, apparently characteristic of the Dutch elm disease, were sampled in the area infected in New York. Culture results of these are not yet available. Probabilities are that infected trees will now rapidly show themselves and can readily be picked up as soon as scouts can be placed in the field. Field observations in lower Westchester County, N. Y., show considerable canker-worm defoliation of elms. If this progresses to most of the elm trees, lack of foliage will seriously hamper scouting for the Dutch elm disease, as the defoliated branches will present a dormant, winter appearance.

FOREST INSECT INVESTIGATIONS

An oriental insect established in the New York area.--Among a large number of insects taken from elms infected by the Dutch elm disease and sent in by W. D. Buchanan, of the Morristown, N. J., laboratory, for identification, one lot was found by M. W. Blackman, of the Washington office, to comprise about 50 specimens of Xylosandrus (Xyleborus) germanus Blandf. These ambrosia beetles of the family Scolytidae were collected at East Orange, N. J., on May 6, 1934, where they were attacking the stumps of trees recently treated for Dutch elm disease. The trees had been cut and burned and the stumps had been barked and treated with oil. X. germanus occurs naturally in Japan, Formosa, and Chosen (Korea). In 1932 it was reported by E. P. Felt as having been found in a greenhouse in Oyster Bay, L. I. It apparently has now become established out of doors in the vicinity of New York City and has found our native elm a satisfactory host.

Pine beetle control successfully maintained.--According to F. P. Keen, of the Portland, Oreg., laboratory, a recent inspection of the white pine forests subject to damage by the mountain pine beetle in Mount Rainier National Park showed that the infestation on controlled areas had been practically eliminated.

Damage by ambrosia beetle forecast.--R. R. Furniss, Portland, reports that logging operators in the Douglas fir area of Oregon and Washington face the possibility of considerable losses during the current season from activity of ambrosia beetles. Labor disturbances have forced many concerns to leave large quantities of felled timber in the woods. Although no great loss has been experienced to date in the operations observed, it is certain that if the logs remain in the woods during warm summer weather losses will increase rapidly. Ambrosia beetle damage occurs very quickly during the summer months and since the select lumber grades are affected, damage is often heavy. One operator in Washington reported a loss of 25 percent from ambrosia beetle activity in 1934. As losses often occur under normal operating conditions, increased losses may be expected when the logs remain in the woods longer than usual. Initial attacks were noted this spring about the middle of April. The important lumber-producing trees and the species attacking them, as noted this year, are: Sitka spruce, attacked by Trypodendron bivittatum Kby.; western hemlock, by T. bivittatum and Gnathotrichus sulcatus Lec.; Douglas fir, by T. bivittatum, Gnathotrichus retusus Lec., and G. sulcatus.

Ochoco control project nears completion.--W. J. Buckhorn, of the Portland, Oreg., laboratory, reports that the western pine beetle control project on the Ochoco National Forest, which is being carried out by C. C. C. labor, is now nearing completion. Some 4,000 infested trees have been spotted and 3,461 trees had been treated when the work was inspected by Mr. Buckhorn during the latter part of the month. It is expected that the project will be completed by June 8.

Coeur d'Alene National Forest control project.--J. C. Evenden, of the Coeur d'Alene, Idaho, laboratory, reports that control measures were instituted on the Coeur d'Alene National Forest against the mountain pine beetle in white pine early in May. Although there are two N. I. R. A. camps operating on this project, most of the work is being done by C. C. C. laborers from four camps with trained personnel. The work is progressing smoothly and it is expected that the project will be finished by June 15.

Phenological data.--Mr. Evenden reports that a comparison of 4 years' phenological data taken at the Coeur d'Alene laboratory shows that the spring of 1935, although much later than that of 1934, is in reality very near normal. The spring of 1934 was exceedingly early. The following data show development of serviceberry flowers for 4 years, as well as the start of the pupal stage in Dendroctonus brevicomis Lec. In 1932 the serviceberry flowers unfolded on April 27; in 1933, on April 28; in 1934, on April 11; and in 1935, on May 3. In 1932 the pupal stage of overwintering broods of Dendroctonus brevicomis started on southern exposure on April 27; in 1933, on April 29; in 1934, on April 12; and in 1935, on May 2.

Mountain pine beetle in whitebark pine.--T. T. Terrell, Coeur d'Alene, reports that a small experimental control project against the mountain pine beetle in whitebark pine stands on Mount Washburn, Yellowstone National Park, proved rather successful. This project was instituted in 1934 to determine whether a successful reduction would follow artificial control on a limited area adjacent to other infestations. In 1934, 2,643 infested trees were cut and burned on a 5,000-acre area, and although there were other infested areas within a few miles, only 950 trees were attacked in 1934. This reduction of 64 percent shows that, although there was apparently some reinfestation from other infested areas, it is possible through the institution of control and maintenance work to protect an area of this character until the epidemic on adjacent areas dies down.

Oregon pine engraver beetle hibernates in litter.--J. A. Beal, of the Denver, Colo., laboratory, reports that late in April overwintering adults of the Oregon pine engraver (Ips oregoni Eich.) were found hibernating in large numbers in the litter and duff near infested trees and slash on the Harney National Forest, S. Dak. Some of the beetles had bored into old cones, cone scales, and small pieces of wood and twigs buried among the needles, but many of them remained free in the litter. They were inactive when found, but upon exposure to the warm rays of the sun quickly revived and became very active. A few beetles were found as far as 5 feet from the base of standing Ips-killed trees. It was evident that a majority of the beetles were hibernating in the litter and duff but, as some had already dispersed, no accurate estimate could be made. From the number of beetles still in the litter it was roughly estimated that more than 75 percent of the adults had overwintered in this situation.

Winter-killing of pine shoot moth.--J. V. Schaffner, Jr., of the Melrose Highlands, Mass., laboratory, reports that the extremely severe winter of 1933-34 followed by the cold winter of 1934-35 has resulted in tremendous reduction, possibly in extermination, of the European pine shoot moth (Rhyacionia buoliana Schiff.) in a planting of Scotch pine in Winchester,

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Liberation of parasites of larch case bearer.--P. B. Dowden, Melrose Highlands, reports on the total issuance of parasites obtained from 200,000 hibernating larch case bearer larvae received from Hyéres, France. There were 15,307 *Chrysocharis laricinellae* Ratz. liberated as follows:

Date	Place	Chrysocharis liberated		
		Total	Males	Females
		Number	Number	Number
May 1----	Woodstock, Conn.	2,200	1,100	1,100
May 10----	do.	1,760	860	900
May 3----	Berlin, N. H.	4,038	2,001	2,037
May 8----	Sharon, Vt.	4,022	2,016	2,006
May 17----	Lempster, N. H.	1,775	1,100	675
May 22----	Winchester, Mass.	1,512	1,344	168
Total---	--------------------	15,307	8,421	6,886

Three other species of parasites were obtained, 419 *Cirrospilus vittatus* Walk., 674 *C. pictus* Nees, and 960 *Dicladocerus westwoodi* Steph. These species act as secondary parasites as well as primary and were not liberated. On May 21 a single specimen of *Chrysocharis* was collected at Woburn, Mass., in an infestation of *Kaliofenusa ulmi* Kieff. This has been determined by the Division of Identification and Classification as *Chrysocharis laricinellae*. As Woburn is more than 25 miles distant from the nearest locality where *C. laricinellae* has been liberated, this recovery indicates that the species may already be established in this country in certain localized areas although it has not yet been obtained from large collections of *Coleophora laricella* Hbn. and *Phyllotoma nemorata* Fall.

Elm leaf beetle parasites.--Mr. Dowden also reports that puparia of *Anachaetopsis nitidula* Rond. are being obtained from a shipment of approximately 25,000 hibernating elm leaf beetle adults received from H. L. Parker, Hyéres, France. Dissection has shown that the adult beetles are about 9 percent parasitized by this tachinid. The first puparium was noted on May 30 and 100 puparia were removed on May 31. This tachinid was liberated at Woburn, Mass., in 1934. Between May 6 and 17 over 10,000 elm leaf beetle adults were collected at this colony site for recovery of the parasite.

Liberation of pine shoot moth parasites.--Mr. Dowden and P. A. Berry report that 65 mated females of Ephialtes examinator Fab., which had successfully hibernated in the laboratory, were liberated on May 28 in an infestation of the pine shoot moth at New Vernon, N. J. On May 31 a colony consisting of 10,000 Tetrastichus turionum Hartig., a pupal parasite of the European pine shoot moth, was liberated at the same locality in New Vernon.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Forced spraying for gypsy moth in Pennsylvania.--Within the Pennsylvania infested area there are a number of heavily populated centers in which the individual property holdings are rather small, particularly in cities. Where spraying is necessary in such sections, signed permits for this work are obtained from the owners or the renters. In all instances where the owners or renters refuse to sign permits for spraying, a duly authorized agent of the State Department of Agriculture sends to each individual, in the name of the Secretary of Agriculture, a notice of treatment informing him that it is necessary for him to have all trees, shrubs, or woody plants on his premises thoroughly sprayed, to the satisfaction of the inspector of the Department, and that such treatment must be applied within 5 days of the date on which the notice is served. He is further notified that failure to apply the treatment, within the time specified, will make it necessary for the Department to apply the spray and he will be liable for the expense of such treatment.

Gypsy moth defoliation kills some trees.--Since the beginning of the new growing season it has been possible to determine the effect of last year's severe defoliation for some of the trees in areas stripped for the first time in the summer of 1934. This was particularly true of evergreens. Examinations, made in one area in the northwestern section of Worcester County, Mass., have shown that, in a considerable area stripped for the first time in 1934, 38 large hemlocks, some over 50 feet in height, were killed by 1 year's defoliation. In the same general locality many small pines, averaging about 5 feet in height, show marked evidence of severe damage. A sample plot, one-sixteenth acre in extent, contained 94 of these small pines and of these only one is in good condition at present. Nearly half are completely dead or show so few signs of life that they will probably die. With the exception of the one tree, which is in good condition, all others that show signs of life are very seriously injured. On another defoliated hillside in the same section, 43 pines, averaging about 30 feet in height, were killed by being defoliated last year.

C. W. A. work against brown-tail moth a success.--From recent reports, received from New Hampshire and Massachusetts, it is evident that the C. W. A. project for brown-tail moth extermination, conducted from December 1, 1933, to February 15, 1934, generally within the brown-tail-moth-infested area and continued by the State of New Hampshire until the end of March after the Federal project was discontinued, decreased degree of infestation to a marked extent. In Massachusetts, during the winter of 1934-35, 169,352 brown-tail moth webs were cut, in contrast to

328,310 cut under the C. W. A. project. In New Hampshire the difference is more marked, as, during the past winter, 1,548,287 were cut, whereas, under the C. W. A. project and State work, to the end of March 1934, 13,671,542 were cut and destroyed.

PLANT DISEASE CONTROL

Stem rust situation.--On June 4 E. C. Stakman reported that freezing temperatures in Texas on January 20 and 21 and again in February killed most of the rust-infected plants, so that little stem rust survived. Observations in April indicated only a trace of overwintering on wheat in Texas, and no stem rust was found at that time in Oklahoma. Overwintering apparently occurred in wheat fields in Mexico, but there was less rust this spring in northern Mexico than at the same time in 1934. General spread of stem rust on wheat began in the San Antonio, Tex., area after the middle of March, but infection did not appear on oats until later. By harvest time rust had caused severe losses in some fields of durum wheat near San Antonio, and an infection of from 34 to 40 percent had developed on common and durum wheats in Kerr, Kendall, and Gillespie Counties. In a considerable section of the North Central States, leaf rust overwintered abundantly on wheat.

Resurvey progress in barberry-infested areas in Wisconsin.--The figures given in the table below provide eradication data for comparison between the first and second inspections in the southeastern part of Dodge County, Wis., and in the territory around Lake Geneva.

Property no.	Eradication in 1929			Eradication in 1935		
	Bushes	Seedlings	Salt applied	Bushes	Seedlings	Salt applied
Dodge County	Number	Number	Pounds	Number	Number	Pounds
1	50	200	500	0	0	0
2	251	120	4,700	9	0	55
3	148	3,000	3,330	37	101	80
4	65	31	350	2	0	4
5	140	60	700	2	0	40
Total	654	3,411	9,580	50	101	179
Lake Geneva area						
1	17	--	56	1	--	1/
2	13	--	35	1	--	1/
3	17	--	25	5	--	5
4	351	185	300	266	--	100
Total	398	185	416	273	--	105

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Blister rust found on white pine in Wooster Arboretum in Ohio.--A specimen of diseased white pine from the Wooster Arboretum in Wayne County, Ohio, has been definitely identified as blister rust, which extends the range of this disease southward in Ohio by about 50 miles. The Wooster Arboretum is one of the finest in the Middle West and contains excellent plots of practically all white pines indigenous to the United States as well as several exotic species.

Eradication crews carry cartridge belts outfitted with chemicals for treating Ribes.--During a recent test of various chemical apparatus developed during the winter for use in blister rust control work in the West, it was found that cartridge belts outfitted with individual dosages of chemical could be used with complete satisfaction by eradication crews for treating occasional Ribes bushes that are abnormally difficult to eradicate by regular grubbing methods.

Treatment of diseased pines.--Several C. C. C. men in Pennsylvania were engaged during April on the treatment of diseased white pines in State plantations. The following results were obtained from this work: Estimated number of pines examined, 57,272; number of fatally infected pines cut down, 4,969; number of pines treated for infection, 24,934; number of cankers removed--branch, 41,591, stem, 5,053; man-days of labor, 620.

Many Ribes destroyed in Maryland.--During the month of May Ribes-eradication work in Maryland reached its crest for the year with a total of 224,674 wild and 664 cultivated Ribes removed from 8,208 acres. Thirty-two P. W. A. workers removed 87,021 of these bushes, and the remaining 138,317 Ribes were removed by 36 men from three C. C. C. camps.

COTTON INSECT INVESTIGATIONS

How beet armyworm damages cotton.--Observations were made on the feeding habits of the beet armyworm by A. J. Chapman, L. C. Fife, and H. S. Cavitt in the Big Bend district in Texas. They report: "The young cotton plants were attacked as soon as they appeared above ground. The first, second, and third instars fed almost entirely on the under side of the leaf, skeletonizing it, but the later instars fed on both sides and ate large circular holes through the leaf. During the day they usually fed in the shaded or protected situations, with many of the older larvae concealed beneath debris, clods, or leaves on the ground. When many larvae fed on a plant all of the leaves were entirely consumed. On many of the plants the stems were eaten just below the bottom leaf, causing the top to fall over. The stems of small plants with only two leaves were frequently cut off just above the soil surface, as by cutworms. On alfalfa, the leaves were skeletonized, causing the entire field to have a whitish appearance. In this locality L. exigua was observed to feed on alfalfa, beets, corn, chili, hegari, lettuce, onions, peas, turnips, Johnson grass, horse nettle, pigweed, careless weeds, and other weeds. Alfalfa, beets, and cotton seem to be the preferred host plants, then hegari, corn, and turnips. Attempts at control by dusting or spraying with calcium arsenate, poisoned-bran bait, and irrigation were not satisfactory. By June many of the larvae in the Big Bend were parasitized and a disease had appeared which was killing the larvae in large numbers and no further damage is expected this year.

Pink bollworm emergence.--A series of hibernation cages to determine the seasonal emergence, and also the effects of different environmental conditions on survival of the pink bollworm were installed last fall at Presidio, Tex. W. L. Owens, Jr., reports that 3.07 percent of the worms installed had emerged as moths by May 31. This is slightly below the average for the past 7 years. The peak of emergence this year came in April, which was much earlier than last year (May 8). The peak also occurred considerably before squares large enough to infest were present. The survival from larvae spinning free cocoons in the soil was very low and no moths emerged from 800 larvae in infested blooms.

Notes on cotton flea hoppers.--K. P. Ewing and R. L. McGarr report that hatching of flea hoppers in the hibernation cages at Port Lavaca, Tex., was apparently finished by May 16. The total number recorded this year was slightly more than last year, or 46,484 as compared to 44,085 in comparable cages in 1934. The migration from wild host plants to cotton is considerably later than last year, as shown by flight screens, field inspections, and sweeping records. Twelve flight screens caught the following numbers of hoppers during the past 3 years: In 1933, 615 in April and 1,990 in May; in 1934, 79 in April and 2,220 in May; and in 1935, 440 in April and 484 in May. For the week ended June 1 the catch was 116 flea hoppers, but this increased to 565 for the week ended June 8, indicating that heavy migration was in progress. In 1934 the heavy migration started during the second week of May following heavy rains. This year there was 5.33 inches of rain on June 3 and showers for several days, which again stimulated migration. In addition to the regular screens located 3 feet from the ground, two screen towers 24 feet high with screens located at heights of 6, 12, 18, and 24 feet were placed in operation. More flea hoppers were caught at the 24-foot level than at any other, although there was not much difference in the different levels. The delayed migration to cotton has enabled many early squares to form. Considerable numbers of nymphs that had bred on cotton were present by the middle of May and, with the influx from the early June migration, the population is expected to increase rapidly.

Cotton aphids.--F. F. Bondy and C. F. Rainwater, Florence, S. C., report more than usual damage to cotton by aphids along the Atlantic seaboard. In a limited survey made by Rainwater in May, five species of aphids were found on cotton. Three of these are subterranean and two aerial in habitat. Applications of 200 pounds per acre of each of the following substances were tried as control measures: Calcium cyanamid ; 5 percent nicotine sulphate and 95 percent lime; 1 part sodium cyanide and 20 parts lime; 1 part paradichlorobenzene and 20 parts lime. The materials were thoroughly mixed with the soil the day of planting. No injury to germination was observed, but the calcium-cyanamid plots showed severe injury to the seedling cotton. Weekly records are being made of the number of ant hills present in the plots.

Correction.--In the June 1, 1935, News Letter (vol. 2, no. 6), p. 13, in footnote 1 to table, for equal read and. Also in the third line below the table for cleanliness, etc., read how clean the cotton was picked.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Trap-plot cotton in the Big Bend area of Texas.--The trap-plot cotton in the Castolon section of the Big Bend began blooming the latter half of the month (May), and daily bloom collections were started on May 20. On this date the first infested bloom was found in one of the field-planted plots, and on May 22 in the other field-planted plot and in the stub plot. The two field plots were planted on approximately the same dates the past two seasons, but this season the cotton seems to be making much faster growth, and a larger number of worms is being found. The number of infested blooms in the Castolon plots also showed quite an increase during the first week in June. By the end of the coming month it should be possible to make some accurate comparison of the infestations for the past two seasons. The plot cotton is at least 2 weeks in advance of the commercial cotton in the Presidio section, and probably farther advanced in the Castolon section.

Pink bollworm control work in Florida.--The survey of the Key West group was completed about the middle of the month, and we now have accurate knowledge of the wild-cotton colonies on the mainland keys from Key Largo to and including Key West. The prospect of complete eradication of wild cotton in the above area now appears to be extremely favorable. On the west coast the recleaning was continued, and by the middle of the month practically all of Charlotte County had been covered. The only scouting done above Miami on the east coast was a hurried survey made in June and July 1932. The small colony near Grant was found as a result of information supplied by an individual at Key Largo. It has seemed advisable to make an intensive survey from Miami northward at least to the frost line, and this survey was begun about the middle of May.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Low strengths of rotenone highly toxic to larvae of imported cabbage worm, tests indicate.--C. B. Wisecup and J. P. Vinzant, of the Sanford, Fla., laboratory, report that in recent laboratory tests very low strengths of rotenone were effective in killing quarter-grown and half-grown larvae of the imported cabbage worm (Ascia rapae L.). In the process of conducting these tests a derris-root-powder suspension in water was applied to both surfaces of cabbage leaves, giving a uniform coverage of the spray material without the addition of a sticker or spreader. The larvae were exposed to the treated food for a 24-hour period and were then kept under observation for 4 days. The percentages of kill are shown in the following table.

Rotenone content	Kill of larvae	
	Quarter-grown	Half-grown
Percent	Percent	Percent
0.0057-----	98.3	96.6
0.0115-----	99.1	95.0
0.0230-----	99.1	97.7
0.0575-----	99.1	98.3

The experiment described above was enlarged to include a similar series of tests with the celery leaf tier (Phlyctaenia rubigalis Guen.). Derris proved ineffective as a toxic agent against this species, as the larvae showed no detrimental effects other than a slight hesitancy in feeding, thus corroborating previous laboratory tests in which it was demonstrated that insecticides containing rotenone are not effective against the celery leaf tier.

Pea weevils survive low winter temperatures at relatively high altitudes in Idaho.--In experiments designed to determine the survival of the pea weevil (Bruchus pisorum L.) at different altitudes on Moscow Mountain, near Moscow, Idaho, during the winter of 1934-35, T. A. Brindley, of the Moscow, Idaho, laboratory, reports that the pea weevils survived at altitudes up to and including 4,750 feet and that, in general, the winter survival was greater at the higher altitudes. In addition, the results of these experiments showed that winter survival was much higher near the ground, where the insects were protected by a heavy covering of snow, than above the snow level. The weevils in cages above the snow level failed to survive a minimum temperature of 21° below zero, whereas approximately 57 percent of the weevils below the snow level survived this temperature.

Promising results from trapping and burning adults of gulf wireworm.--K. L. Cockerham and O. T. Deen, of the Biloxi, Miss., laboratory, report that recent field tests in trapping and burning the adults of the gulf wireworm (Heteroderes laurentii Guer.) indicate that the percentage of beetles destroyed ranged from approximately 80 to 95 percent in two fields of Irish potatoes. In these tests the potato vines, together with the weeds growing in the fields, were raked into windrows immediately after the potato harvest. A large percentage of the total wireworm adults present in the field congregated under these windrows. Plant material in the windrows was burned after it became sufficiently dry to maintain a running fire, aided by applications of small quantities of kerosene. In general, these preliminary field tests indicated that this method may aid greatly in the control of the gulf wireworm, provided the treated fields are thoroughly cleaned of plant material by raking, so that there will be a minimum of hiding places for the beetles, except in the windrows. It appears that in clean fields and in dry weather a very large number of beetles can be killed with a minimum of effort by following this procedure of trapping and burning.

Males of two wireworm species in Pacific Northwest are capable of multiple mating.--C. E. Woodworth, of the Walla Walla, Wash., laboratory, reports that in recent laboratory tests to determine the question of multiple mating of male click beetles of the Pacific coast wireworm (Limonius (Pheletes) canus Lec.) and the sugar-beet wireworm (L. californicus Mann.), 75 percent of the males fertilized at least 2 females, 50 percent fertilized 3 females, and at least 25 percent fertilized 4 females. These results have an important bearing upon the question of whether trapping male click beetles is an effective means of reducing the population of these two destructive species of wireworms in the Pacific Northwest. Superficially, it appears that, although traps have been devised to collect large numbers of male beetles, the survivors would be capable of fertilizing the females in any given locality.

Surface-soil moisture essential for maximum effectiveness of mole cricket bait.--J. N. Tenhet, of the Sanford, Fla., laboratory, reports that in recent laboratory tests with poison baits for the mole crickets, Scapteriscus spp., it was shown very definitely that the mole crickets fed to a much greater extent on the bait if the surface soil was watered just prior to application. Under these circumstances approximately 62 percent of the mole crickets fed upon the bait, whereas when the soil surface was not watered, only 26 percent of the mole crickets fed on the wheat bran, which composed the principal constituent of the poisoned bait. A new technique has been developed whereby it can be readily determined whether mole crickets under observation have fed on a particular bait. The bait is dyed a bright red by means of a harmless food dye and is placed before the mole crickets late in the afternoon. Early the following morning the mole crickets are killed in a cyanide jar and the stomach contents are examined. The presence of bait in the stomach contents is easily revealed by the dyed food material. The principal species involved in these tests was S. acletus R. & H.

Cube-dust mixtures effective against striped flea beetle in Louisiana.--Norman Allen, of the Baton Rouge, La., laboratory, reports that in field experiments, dust mixtures composed of cube-root powder containing 1 percent rotenone, with equal parts of tobacco dust and 300-mesh dusting sulphur as diluents, have given excellent control of the striped flea beetle (Phyllotreta vittata Fab.), when applied thoroughly to young turnip and mustard plants at weekly intervals. In comparable tests the applications of pyrethrum-dust mixtures were ineffective at strengths ranging from 0.12 to 0.49 total pyrethrins, that would be practical for ordinary field use.

INSECTS AFFECTING MAN AND ANIMALS

Screw worm campaign launched in Southeast.--Upon completion of the organization of the field personnel, educational, control, and research work was started immediately in over 250 counties in the Southeastern States. The livestock owners in these counties are receiving benzol and pine tar oil free of charge for the treatment of their animals, Bureau representatives in the counties are holding meetings to demonstrate to the stockmen the proper methods to use in the treatment and care of infested animals and how to prevent screw-worm infestations, and pens and chutes are being built to facilitate the handling and treatment of infested livestock.

FOREIGN PARASITE INTRODUCTION

Pink bollworm parasites from Egypt.--H. D. Smith, of the Hyéres, France, laboratory, has recently forwarded a consignment of larvae of Exeristes roborator Fab. and pupae of Elasmus sp., reared from the pink bollworm in Egypt. The Egyptian strain of E. roborator is the most important of the pink bollworm parasites in that country and attacks the pink bollworm more readily and more extensively than it does the corn borer. It is hoped that it will be better adapted to Texas conditions than the European corn borer strain, on which work has been done for several years.

Fruit fly parasites to Egypt.--Late in May a second attempt was made to forward colonies of adult fruit fly parasites to Egypt. The first shipment in November 1934 by direct steamer from Hawaii westward resulted unsatisfactorily, owing to the long period in transit and to inadequate attention. The present shipment was sent by steamer to San Francisco, by air express to Camden, N. J., by steamer to Cherbourg, France, and by air express from Paris to Cairo. The total elapsed time in transit was less than 3 weeks. This material was assembled by O. C. McBride, of the Honolulu fruit fly laboratory, and the shipment was examined and repacked at the Japanese beetle laboratory at Moorestown, N. J.

Tiphia shipment from Japan.--On May 18 R. W. Burrell, of the Yokohama laboratory, forwarded a consignment of 3,500 adults of Tiphia sp., intended for colonization against Serica and Autoserica.

Parasite shipment to Poland.--On May 31 a consignment of 328 scoliid cocoons of the genera Elis and Tiphia was forwarded to M. Nunberg, of the Research Institute of State Forests, Warszawa, Wawelska, Poland. These were collected in Indiana in April by P. Luginbill, of the cereal and forage insects laboratory at La Fayette.

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Twenty-four living larvae and 17 living pupae were taken on September 26, 1933, at New York in five peaches in baggage from France. It has now been possible to identify these definitely as the Mediterranean fruit fly. This fruit fly was intercepted previously in peach from France on October 9, 1928. A specimen of Macroplax fasciatus H. S. was found last January at Washington, D. C., with Cistus sp. seed in the mail from Turkey. Living and dead larvae of the Asiatic rice borer (Chilo simplex Butl.) arrived at New York in rice straw in cargo from Spain. Three living larvae of the pepper weevil (Anthonomus eugenii Cano) were taken at El Paso, Tex., in green chili peppers in cargo from Mexico. This weevil is recorded from southwestern United States. The mealybug Pseudococcus galapagoensis Morrison was intercepted at San Francisco on Cereus sp. in cargo from the Galapagos Islands. Ten living larvae of the yam weevil (Palaeopus costicollis Marsh.) arrived at Boston in yams in baggage from Jamaica. Living larvae of the tomato pinworm (Gnorimoschema lycopersicella Busck) were taken at New York in tomatoes in cargo from Cuba. This gelechiid is also recorded from California, Pennsylvania, the Bahamas, Hawaii, Mexico, and Peru. Two living pupae of *Plusia ni* Hbn. were found at New Orleans on cabbage leaves in stores from England. An adult of *Diabrotica tibialis* Jac. arrived last February at Baltimore, Md., with banana debris in cargo from Guatemala. A living adult of *Monotoma centralis* Sharp was intercepted at Brownsville, Tex., in a green bean in baggage from Mexico. Living specimens of *Monanthia monotropidia* Stal were taken at Philadelphia on bananas in cargo from Guatemala. Living adults of the West Indian sugarcane borer (*Metamasius hemipterus* L.) were intercepted at Mobile, Ala., on bananas in cargo from Honduras; at New Orleans with banana debris in cargo from Nicaragua; and at Seattle on bananas in cargo from Ecuador. This weevil is a serious pest to the stalks of cane and is liable to importation in seed cane.

Pathological interceptions of interest.--Several of the following plant disease organisms are new to our interception files, others were intercepted for the first time on the host named or from the country named: *Botrytis allii* Munn at Seattle on March 20, on onions from Japan; *Bremia lactucae* E. Regel at New York on April 23 on lettuce from Germany; *Ceratostomella* sp. at New York on March 20 on malanga root from Dominican Republic; *Cercospora apii* Fresen. at New York on April 19 on parsley from Spain; *C. neriella* Sacc. at New York on April 3 on oleander from Bermuda; *Chrysomyxa piperiana* (Arth.) Sacc. and Trott. at Seattle on May 10 on rhododendron from Canada; *Exobasidium vaccinii* (Fckl.) Wor. at Philadelphia on May 11 on azalea from Sweden; *Glomerella cingulata* (Ston.) Spauld. and Schrenk at Mobile on May 10 on apple from Tasmania; *Leptothyrium* sp. at Washington on March 15 on *Hura crepitans* seed from Venezuela; *Nectria* sp. (near *N. episphaeria* (Tode) Fr. but spores somewhat larger) at Norfolk on April 7 on an orange from Puerto Rico; *Peronospora parasitica* (Pers.) D. By. at Philadelphia on May 14 from Holland; *Pestalozzia* sp. at Boston on May 16 on *Sobralia* sp. (an orchid) on S. S. *Jacob Ruppert*, source unknown, perhaps picked up en route from Little America; *Phoma rostrupii* Sacc. at Philadelphia on May 15 on carrot from England; *Phoma* sp. at New York on May 10 on lettuce roots from Trinidad; *Phoma* sp. at Philadelphia on May 6 on a potato from Spain; *Phomopsis* sp., probably an undescribed species, at New York on April 22 on star-apple fruit from Puerto Rico; *Puccinia rubigo-vera tritici* (Eriks. and Henn.) Carl at New York on February 26 on wheat straw from Portugal; *Sclerotium bataticola* Taub. at New York on April 24 on melons from Chile; *Septoria* sp. (no species listed for North America on this host) at Baltimore on April 23 on *Acanthus* sp. from Dominican Republic; *Sphacelotheca panici-leucophaei* (Bref.) Clinton at New York on April 29 on *Trithacline* (*Valota*) *insularis* from Puerto Rico; *Sphaeronema* sp. (no species found reported on *Allium*, except interceptions) at Charleston on April 24 on onion from Spain; *Uromyces betae* (Pers.) Lev. at New York on Swiss chard from Spain.

Notes on nemas.--*Aphelenchoides* n. sp. was found in abundance in a husk tomato, *Physalis ixocarpa*, from Mexico intercepted at Mobile on May 18. The fruit was in bad condition but since *Oospora lactis parasitica* F. J. Pritchard and W. S. Porte was present also, it was not possible to determine the amount of damage done by the nema. According to an abstract in the Review of Applied Mycology 14:217, a destructive tuber rot of yams (*Dioscorea* sp.) in

Nigeria appears to be primarily due to the eelworm Hoplolaimus bradys Steiner and Le Hew. See the note at the bottom of page 21 of the June News Letter regarding a new species of Hoplolaimus in yam from Nigeria. It is doubted whether material of H. bradys was available in Nigeria, hence possibly the species reported on is not H. bradys but the undescribed species recently intercepted.

Name changed.--A Phoma intercepted on carrot from France on April 1 at Port Arthur (See June 1 News Letter, p. 21) and from England on May 15 at Philadelphia was determined as Phoma sanguinolenta Rostrup. According to J. A. Stevenson, this name was used by Grove for another species, making a change necessary. The species on carrot is now Phoma rostrupii Sacc.

Accidents will happen, even in smuggling.--The elderly lady just off the boat from Puerto Rico carefully hung her sweater and coat on the dock fence at New York and opened her baggage for inspection. The plant quarantine inspector removed five sapodillas from her suitcase and passed on. The elderly lady gathered up her luggage and also went on her way, apparently forgetful of her wraps. Another lady left the plant quarantine inspector at work on her things, grabbed the sweater and coat and would soon have had them in the hands of their owner at the gate but as she started with them a mango thumped to the dock. So the plant quarantine inspector took charge of the garments, finding two more mangoes and three sapodillas in a sweater sleeve with the cuff tied to form a bag. Three fruit fly larvae found in one of the mangoes were later determined as Anastrepha acidusa Walk.

DOMESTIC PLANT QUARANTINES

Elms from Dutch elm diseased area intercepted.--Three Chinese elms shipped from the area regulated under the Dutch elm disease quarantine to a point in Pennsylvania were intercepted by a transit inspector at Long Island City on May 27 and turned back to the shipper. This is the first violation of Quarantine No. 71 that has been discovered in transit inspection.

Phony peach disease control.--All commercial peach orchards in nine counties in northern Georgia were inspected in May. Growers furnished labor to dig up and remove all infected trees as located by the inspectors. Field activities are also under way or are to start in June, in cooperation with State inspectors, in Alabama, Mississippi, Louisiana, Arkansas, Tennessee, North Carolina, and South Carolina. Inspection will be made of commercial orchards and the environs of nurseries in all infected States. In addition to intensive inspection in the known infected commercial areas of Arkansas, Illinois, Missouri, Tennessee, North Carolina, and South Carolina, a general survey of other parts of these States will be made to determine whether the disease is present. Such a survey has also been started in Delaware and will be extended to the States of New Jersey, Maryland, Virginia, West Virginia, Ohio, Indiana, and Kentucky, none of which is known to be infected. In regions of light infection an intensive effort is being made to locate and eradicate infected trees in order to check the northward spread of the phony peach disease.

Citrus trifoliata destroyed in Texas.--Continued inspection for citrus canker has resulted in finding additional infections in Brazoria County, some of which are old infections on large trees. Owners are cooperating in the destruction of Citrus trifoliata and the State has hired laborers to assist State inspectors in digging up and burning infected trees, as well as all adjacent trees.

Citrus canker inspection in Louisiana.--An intensive tree-by-tree inspection in the commercial citrus area of Plaquemines Parish of southern Louisiana, approaching completion the middle of June, has resulted in finding no citrus canker.

Narcissus bulbs inspected in Texas.--In order to keep open the avenues of trade with other States and insure that clean bulbs are shipped, inspectors in Texas have arranged to conduct the same inspection service for narcissus bulbs as that formerly required under Federal Quarantine No. 62. No special regulations have been placed in that State, according to recent word from Texas officials.

CONTROL INVESTIGATIONS

Toxicity of rotenone and pyrethrins alone and in combination.--The results obtained by F. L. Campbell and W. N. Sullivan, Takoma Park, Md., by the turntable method, show that rotenone in alcholic solution is about 5 to 6 times as toxic as an alcoholic mixture of pyrethrins I and II in about equal proportions. There also appears to be a synergistic effect when rotenone and the pyrethrins are mixed in equal proportions.

Relative toxicity of pyrethrins I and II.--Tests by Messrs. Campbell and Sullivan against house flies showed a mixture of 94.5 percent pyrethrin I and 5.50 percent pyrethrin II to be about 2.5 times as toxic as pure pyrethrin II, a compound submitted by H. L. J. Haller and F. B. La Forge of the Insecticide Division.

BEE CULTURE

Oregon honey-plant study.--F. E. Todd, in charge of the Pacific States Bee Culture Field Laboratory, Davis, Calif., reports that a cooperative project outlining honey-plant observations, to cover several years, is now in progress between the laboratory and the Oregon Agricultural College. Studies were inaugurated by G. H. Vansell in the Umpqua, Hood, Willamette, and Rogue River fruit areas this season. Pears provided an abundant supply of pollen for the bees but the nectar had comparatively little attractiveness. Spray poisoning of bees is a phase of the pollination problem that often becomes acute, especially when a cover crop is used. Poisoning from vetches is current before any blossoms appear, because bees visit some of these plants for extra floral nectar.

Loss of bees from plant poisoning.--A serious loss of adult bees has been reported in the mountain sage ranges of Orange County, Calif. Examination of these bees fails to indicate any disease and the only other explanation is that the bees are obtaining either nectar or pollen from certain plant sources that are poisonous. Evidence is gradually accumulating that plant poisoning takes a much larger toll of bees than has heretofore been suspected.

Foulbrood-eradication program.--F. E. Todd reports that at one of the sessions of the Western Plant Quarantine Board, which met in Sacramento the week of May 20, much interest was shown over the possibility of a Federal program, financed with relief funds, for the eradication of American foulbrood. Practically all the States are short of funds for adequate inspection and would welcome Federal assistance. Careful estimates have been made of a Federal campaign to inspect all colonies in the United States and eradicate all diseased ones. Unfortunately, this is a type of work in which only a limited amount of relief labor can be used.

Pollen-reserve study.--C. L. Farrar, of the Intermountain States Bee Culture Field Laboratory, Laramie, Wyo., has just concluded a summation of the survey records of the pollen reserves of colonies in the hands of commercial beekeepers. He concludes that, considering conditions under which the survey records necessarily had to be taken and the uncontrolled limiting factors affecting judgment, apparently where 50 percent of the colonies tend to fall in line with controlled experiments on the influence of pollen reserves on the survival of overwintered colonies, the survey results may be fairly significant. Mr. Farrar says it seems safe to conclude that the average pollen reserves within the region in question are well below the optimum desired for successful wintering; therefore, any method of management designed to increase the pollen reserves would be beneficial to efficient wintering of bees in the intermountain region.

Decrease in claims on package bees.--Warren Whitcomb, Jr., in charge of the Southern States Bee Culture Field Laboratory, Baton Rouge, La., reports that the claims for loss of package bees during the present shipping season have been less than for any season since 1932. The cause of loss of bees during shipment has been narrowed down largely to two factors; namely, high temperature and poor ventilation. Both the shippers and the express agency have taken advantage of these findings, resulting in low losses during the current season.

Package-bee business benefits from marketing agreement.--Most of the shippers of package bees have been able to maintain their business on a paying basis through the operation of the marketing agreement and license. A number of shippers have expressed the urgent desire to do everything possible to retain the agreement and license, which have been beneficial to both the producer and the consumer.

Unusual strain of European foulbrood.--C. E. Burnside, of the Somerset, Md., laboratory, in connection with his diagnostic work, has run across an unusual case of Italian bees failing to clean up European foulbrood. It is well known that European foulbrood is primarily a disease of common black bees and hybrids. Requeening such colonies with Italian stock generally results in negligible losses from European foulbrood. This treatment, even followed with a queenless period, has failed completely for a Maine beekeeper whose bees are affected by what appears to be an unusually virulent strain of European foulbrood. Preliminary tests of this strain at the Bee Culture Laboratory confirm the statement that the strain is unusually virulent, and experiments are in progress to determine the effect of this strain on various races of bees.

Queen bee travels from Tahiti to Maryland in 17 days.--A Tahitian queen mailed at Tahiti on April 22 by E. L. Sechrist was received at Somerset, Md., on May 8 and was laying eggs by May 16.

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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR JUNE 1935

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PUERTO RICAN INSECT PESTS OBJECTS OF SPECIAL RESEARCH

The organization for investigations on insect pests affecting agriculture in Puerto Rico, made possible by an allotment of $93,000 from the Puerto Rican Processing Tax Fund, has been completed. These studies will be headquartered at the experiment station at Mayaguez, P. R., and be handled as one general unit under the Chief of the Bureau. L. C. McAlister, Jr., who has been in charge of the Bureau's field laboratory at Mayaguez, will be in general charge of the laboratory and will act as business administrator and coordinator. The technical aspects of the work will be under the direction of the subject-matter divisions of the Bureau.

Under the immediate and general direction of the Division of Foreign Parasite Introduction, S. M. Dohanian will explore the West Indies and South America for parasites, particularly those that attack insect pests of sugarcane. K. A. Bartlett will be stationed in Puerto Rico to receive and liberate the parasites collected or sent from other laboratories of the Bureau. Under the Division of Fruit Insects, M. R. Smith will investigate coffee insects; H. K. Plank will study coconut insects; and J. W. Balock will seek new ways to control fruit flies. Under the Division of Cereal and Forage Insects, S. R. Vandenberg and F. M. Wadley will study sugarcane insect pests, especially a plant louse now thought to be a factor responsible for perpetuating certain mosaic diseases; and B. A. App will investigate corn insect pests, notably the corn ear worm. Under the Division of Truck Crop Insects, L. B. Scott will study bean insects, and, in cooperation with A. H. Madden, will also study the mole cricket. Under the Division of Cotton Insects, L. C. Fife will make a survey of cotton insects with special reference to plants other than cotton that may be infested by the pink bollworm. He will also study the flower-bud maggot, the blister mite, the cotton leaf worm, and other cotton pests. Under the Division of Insects Affecting Man and Animals, H. L. Dozier will investigate insects that attack cattle, especially the horn fly and screw worms, and G. S. Tullock will determine the distribution of mosquitoes.

FRUIT INSECT INVESTIGATIONS

Control of hickory shuck worm by plowing, preliminary results.--G. F. Moznette, in charge of the pecan-insect laboratory at Albany, Ga., reports: "Three large screen cages were used in this experiment, the first one placed over shucks containing pupae, on the surface of the ground; the second cage over soil where shucks had been plowed under to a depth of approximately 3 inches; and the third in a similar place where shucks had been buried approximately 4 inches. At the end of the emergence period the records showed that 211 moths had emerged from the shucks on the surface of the soil, 16 from the cage in which they had been buried to a depth of 3 inches, and 2 from shucks buried 4 inches deep."

Results in control of pecan nut case bearer confirmed.--C. B. Nickels, of the Brownwood, Tex., laboratory, reports that the use of two applications of lead arsenate (3 pounds in 50 gallons) alone, in combination with 1 pound of zinc sulphate, and in combination with 1/2 pint of fish oil, all reduced pecan nut case-bearer infestations more than 95 percent. Single applications reduced the infestation 75 percent or more. Experiments with nicotine sulphate 1 to 1,000, plus 0.75 percent of summer oil, a combination that has given effective control in Georgia, gave reductions in infestation averaging about 95 percent. A single application gave control nearly as effective as did two applications 10 days apart.

New host of Mediterranean fruit fly in Hawaii.--R. H. Marlowe, of the Honolulu fruit fly laboratory, has just reported that the fruit of the akee tree (Blighia sapida Kon.) is, under some conditions, heavily infested by the Mediterranean fruit fly. The fruit apparently becomes infested chiefly during the last week it is on the tree, when the practically mature fruit has opened and exposed above the black, hard seed an area of soft white flesh, which is very suitable for oviposition. As many as 40 larvae, in various instars, have been taken from one fruit.

Amylene dichlorides have value as insecticides.--O. I. Snapp and J. R. Thomson, of the Fort Valley, Ga., laboratory, have found that straight amylene dichlorides and an emulsion of amylene dichlorides at 50 percent strength are effective for the control of the lesser peach borer attacking peach trees.

Fluorine compounds injure peaches in Georgia.--Mr. Snapp reports severe injury to peaches from the use of barium fluosilicate, synthetic cryolite, and natural cryolite in three applications of concentrations as weak as 1 pound to 50 gallons of spray under the weather conditions that have prevailed this year. Many peaches were injured at the tip, where the tissue is thin over the two cellular spaces, and by May 17 a considerable drop had occurred as a result of the injury.

MEXICAN FRUIT FLY CONTROL

Fruit flies trapped in June.--Only 1 adult Anastrepha ludens Loew was trapped in Texas in June. It was taken at Laredo. Other fruit flies were trapped in Texas as follows: A. serpentina Wied., 15; A. fraterculus Wied., 10; A. sp. "Y", 1; and A. pallens Coq., 310. There were 1,285 larvae of A. ludens and Anastrepha species, probably A. acidusa Walk., taken from infested fruits from the Matamoros and Reynosa markets in Mexico.

DATE SCALE CONTROL

Results of clean-up work.--Systematic inspection in Arizona was completed in June. Only a few individual plantings near Phoenix and Yuma have yet to receive their final inspection. Ground inspection was begun in the Coachella district in the Coachella Valley. This is the last inspection of this district as a whole. If scale is not found most of the plantings will be dropped from the inspection lists. Systematic inspection was continued in the Imperial Valley during the month and no scale was found. This is the first fiscal year since the work was reorganized that scale has not been found in the Imperial Valley.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Insects as vectors of sugarcane diseases.--J. W. Ingram and W. E. Haley, Houma, La., report as follows for the period April to June 1935: "Sugarcane plants in certain fields and the grasses in and around these fields were examined at regular intervals for possible insect vectors, ants, and mosaic-diseased plants. Rusty plum aphids (Hysteroneura setariae Thos.) were found on Andropogon sp. around all fields examined in practically every examination. The corn leaf aphid (Aphis maidis Fitch) was found on Johnson grass (Holcus halepensis). This grass was not found around all fields where counts were made. Crabgrass (Digitaria sanguinalis) was the most common of all grasses found in sugarcane fields. It also showed mosaic disease most often. All four aphids that feed on sugarcane, H. setariae, A. maidis, Toxoptera graminum Rond., and Sipha flava Forbes, were found on it during the quarter. Mosaic disease was also observed on Echinochloa colona and Panicum dichotimiflorum in sugarcane fields during the quarter. All sugarcane aphids except Sipha flava were found on the last-named grass. Observations indicate that the control of mosaic grasses, especially D. sanguinalis, should prove one of the best means of decreasing the spread of mosaic.

Adults of Phyllophaga spp. found feeding freely on annuals.--Philip Luginbill, Lafayette, Ind., reports as follows on collections made 7 miles east of Crown Point, Ind.: "At 9 p.m. we started to make collections and continued this work until 1:30 a. m., June 16. Many beetles were taken from bur oak and hickory and some from white oak, wild plum, and other trees and shrubs. Very little mating occurred, which seemed peculiar, as there was such great activity. After 9 p.m. activity of the beetles became less and less until about midnight, when very little flying occurred. The beetles had settled down to feed and the cool, damp air made them numb. Scouting extended over plowed fields and also over fields in grain and in timothy and clover. Beetles were found feeding on weeds, occasionally only a short distance from forest trees. Narrow-leaved dock (Rumex crispus) seemed to be their favorite food plant. As many as 17 beetles were observed on one dock plant and from 7 to 10 beetles were common. Some of these plants were growing in a field of young corn. A 10-acre field of clover and timothy was thoroughly examined for signs of feeding. To our surprise, it was common to find feeding throughout the night on dock plants growing among the timothy and clover. The fact that May beetles feed readily on weeds may now explain why we find a rather uniform infestation of grubs in a field, the far end of which may be a great distance from a grove of trees."

Experimental wheat varieties show resistance to chinch bug.--E. T. Jones, Manhattan, Kans., reports: "Throughout a large series of wheat varieties and strains in the plots for testing hessian fly resistance at Manhattan, Kans., remarkable differences in the reaction of various varieties to chinch bug and drought injury have been noticed. Plants of varieties susceptible to chinch bugs exhibit severe stunting uniformly throughout the full length of the row, whereas the plants resistant to chinch bugs show no injury whatever and are perfectly normal in every respect. Rows of hybrids from resistant and susceptible parents show segregation for the factor of stunting from chinch bug attack."

Resistance of wheats to hessian fly.--W. B. Cartwright, Sacramento, Calif., reports that variety tests, with several new varieties of wheat added this year, were continued. Of the common wheats, American Banner, Dawson, Harvest Queen, Honor, Illini Kansas Select 223415, and Red Rock were resistant; Illini Chief, Prosperity, and Prohibition approached resistance; and the durum varieties Acme, Monad, and Pentad, were resistant.

Camnula pellucida Scudd. and Oedaleonotus enigma Scudd. in San Luis Obispo County, Calif.--C. C. Wilson, Sacramento, reports as follows on the above species: "All grasshoppers observed were in the adult stage on June 26. Oviposition was first noted on June 15, which is at least 1 month later than in the dry year of 1934. Examination of egg-bed areas indicated abandonment of such areas near cultivated crops and continued oviposition in scattered areas back in the foothills. Examination of soil gave as high as 34 egg pods per square foot, and adult populations of from 5 to 25 per square yard were observed."

Grasshopper control in San Luis Obispo County.--C. C. Wilson, Sacramento, reports that control-campaigns against grasshoppers were practically concluded after the application of 139 tons of bran on the infested area. The campaign was under the direct supervision of the agricultural commissioner's office with the aid of S. E. R. A. labor. This campaign has protected thousands of acres of cereal and forage crops, no damage being evident this year, whereas in 1934 grasshoppers caused losses of over $500,000 to cultivated crops in this county, besides doing serious damage to range grasses.

Peculiarities of homozygous resistant lines in alfalfa resistant to pea aphid.--W. B. Cartwright, Sacramento, reports as follows: "Four families that appeared to be homozygous resistant when the plants were tested in large groups were retested with only two to three plants per pot. In the second tests two plants from one family and one from another family appeared susceptible. One family continued to be almost entirely immune. The appearance of susceptible plants in homozygous resistant lines has been observed by other workers on disease resistance. This seems to indicate the delicate balance within certain plants and also to indicate modifying factors at work. Only those plants continuing to be highly resistant under all conditions will be used for seed multiplication."

Presence of several queens in nests of Atta texana Buckley affects control methods.--In his investigations of the leaf-cutter ants in the San Antonio district of Texas, E. V. Walter has discovered the following interesting facts: "The finding of several queens in a nest, as was reported in the last quarterly report, has helped immensely in solving the control problem. It is now known that the numerous queens may concentrate in a few brood chambers in the center of the nest during the winter but will spread out to more or less independent nests as the weather warms up in the spring. While these independent nests are still within the same general area and at first glance appear as one large nest, a close study will show more or less definite centers of activity, each indicating its own complete family. These are usually connected, but not always sufficiently so for a treatment applied to one nest to affect all others. In order to be sure of control it is therefore necessary to treat all of these definite centers of activity. When the results of various methods of treatment were studied, it was seen that while a few nests were killed by other materials used, carbon disulphide was the only one that could be depended on and, all things considered, was also the cheapest and easiest to use. Work was therefore concentrated on the method of using this material and on the time of year to apply the treatment. It now seems that treatment should be applied as early in the year as the weather is warm enough for the liquid to evaporate readily and before the queens leave the center of the nest to establish their own individual brood chambers. These conditions are apparently best found from late in February to the middle of April. After that time the queens are more distributed, and consequently it is necessary to treat more places and use more material. Of 99 nests treated with carbon disulphide between February 5 and April 16, 88 were killed by the first treatment, 10 required the second treatment, and 1 required the third treatment."

JAPANESE AND ASIATIC BEETLE INVESTIGATIONS

Effectiveness of acid lead arsenate in different types of soil.--A study was made by W. E. Fleming and F. E. Baker, Moorestown, N. J., to determine the effectiveness of acid lead arsenate against Japanese beetle larvae in 15 representative soil types in New Jersey, as compared with its effectiveness in sassafras sandy loam. It was found that the amount of soluble ammonia, phosphorus, and magnesium in the soil were the most important factors influencing the effectiveness of acid lead arsenate. The effectiveness of acid lead arsenate is increased in soils containing high concentrations of water-soluble ammonia or phosphates and is decreased appreciably with the increase of water-soluble magnesium salts in the soil.

Determination of rotenone on foliage in the field.--Tests on this work are being conducted by R. D. Chisholm, Moorestown. The weight of rotenone in the spray residue on foliage from several plots of peach and apple trees was determined by the Gross-Smith method, using chloroform as a solvent and a leaf area of about 200 square inches. Twenty-five apple leaves and fifty peach leaves were used and the areas determined by comparison with templates of known area. Methanol and ether were tried as solvents, but both removed too much of the chlorophyll. The leaves were submerged in chloroform for 2 hours, then the extract was filtered and evaporated to dryness, after which the residue was taken up in acetone. It was found that the derris deposit is fairly constant with the several spray mixtures on the same variety of fruit. The rate of deterioration of the derris will be reported later.

FOREST INSECT INVESTIGATIONS

Compsilura concinnata Meig. established in Washington.--In 1929 the Melrose Highlands, Mass., laboratory began sending the introduced tachinid fly Compsilura concinnata to the State of Washington for liberation in satin moth infestations. R. T. Webber, who is spending this season in Washington where he is making observations on the satin moth and its natural enemies, reports that C. concinnata has been recovered from the satin moth in large numbers at Tacoma and in smaller numbers at Renton, Sumner, Puyallup, and Olympia. This is the first authentic record of the establishment of the parasite in Washington. Two other introduced European species, Apanteles solitarius Ratz. and Meteorus versicolor Wesm., which attack the satin moth and which were also sent to Washington from Melrose Highlands, were found last year to be firmly established in Washington. A. solitarius has spread rapidly and has become a very important enemy of the satin moth throughout the area infested by it.

Experiments with vector of Dutch elm disease.--In his experiments with Scolytus multistriatus Marsh. as a vector of the Dutch elm disease, W. D. Buchanan, of the Morristown, N. J., laboratory, has allowed beetles to enter disease-free elm wood after they had emerged from the same type of wood and fed on diseased elm twigs. After they had entered the disease-free wood, portions of their breeding galleries were referred to the Bureau of Plant Industry and the disease was isolated from 9 of them. In another experiment a disease-free elm log was exposed in the field and breeding galleries made by beetles that were attracted to it were also referred to the Bureau of Plant Industry. Graphium ulmi was isolated from 30 of the galleries. In comparing the results of these experiments with those obtained where beetles from diseased wood fed on the twigs of disease-free trees, Mr. Buchanan says the evidence seems to indicate strongly that infection is much more likely to occur through breeding galleries than at feeding points in twig crotches. In such cases a greater area of bark is exposed to infection, the moisture conditions are probably more favorable, and the inoculum is introduced into less resistant tissues, as these beetles usually attack only weakened material.

Woodpecker predacious on locust borer larvae.--R. C. Hall, Columbus, Ohio, reports that since the initiation of the locust borer study at Columbus in 1931 the hairy and downy woodpeckers have been observed each spring feeding on young locust borer larvae in various parts of the Central States. During the spring of 1935 they were observed on one of our locust borer study areas at Cambridge, Ohio, where on three sample plots they were responsible for the following mortality: Plot A, 48.8 percent; plot B, 42.0 percent; and plot J, 41.6 percent.

Notes on the larch case bearer.--J. V. Schaffner, Jr., of the Melrose Highlands, Mass., laboratory, reports that the permanent sample plots employed for the study of the larch case bearer were visited and observations were made on the degree of defoliation and the condition of the numbered trees. Collections of 500 cases were made at each plot for parasite recovery. The range in degree of defoliation of the trees in each plot was as follows: Berlin, N. H., 50 to 80 percent; Corinth, Maine, 80 to 95 percent; Sydney, Maine, 65 to 85 percent; Sharon, Vt., 35 to 85 percent; Lunenburg, Mass., 40 to 85 percent; North Andover, Mass., 25 to 85 percent; Stockbridge, Mass., 25 to 45 percent; Woodstock, Conn., 25 to 50 percent; Greenfield, N. Y., 15 to 50 percent; Saranac Lake, N. Y., 75 to 100 percent. Trees that have suffered severe defoliation for 2 or more years are in a more weakened condition than at the time of the establishment of the plots in 1933. At Berlin, N. H., 12 of the 32 numbered larches in the quarter-acre plot have died--1 in 1933, 4 in 1934, and 7 in 1935.

Parasites of elm leaf beetle.--P. B. Dowden and P. A. Berry, Melrose Highlands, report that 896 puparia of the tachinid Anachaetopsis nitidula Rond. were obtained from hibernating elm leaf beetle adults received last fall from H. L. Parker, Hyeres, France. The flies issued readily between June 10 and 26 in the cloth-covered emergence cages. On June 23 two colonies, each consisting of 150 males and 200 females, were prepared for transportation to New Haven, Conn., and Morristown, N. J. They were taken by automobile to these two places but unfortunately many of them died before arrival. Only 6 were alive on arrival at Morristown, whereas at New Haven 202 were liberated. The flies were placed in cloth-covered cages darkened by heavy black paper, a method employed for several years at this laboratory for transporting tachinid adults from the laboratory to the field. The reason for the high mortality is somewhat problematical but it appears that some refrigeration or cooling through moisture evaporation is necessary to insure safe transportation of certain tachinid species during the summer months. One adult, tentatively identified by Mr. Dowden as A. nitidula, was reared from elm leaf beetle adults collected at Woburn, Mass., where this parasite was liberated in 1934. This represents the first recovery of this species in America. Messrs. Dowden and Berry report the liberation of the following colonies of Tetrastichus xanthomelaenae Rond. from material received from H. L. Parker, Hyeres, France: Plainfield, N. J., 61 males and 163 females; Dunellen, N. J., 210 males and 505 females; Dunellen, N. J., 198 males and 347 females; Woburn, Mass., 325 males and 500 females; or a total of 794 males and 1,515 females.

Parasites of European pine shoot moth.--Messrs. Dowden and Berry report that four shipments of Rhyacionia buoliana Schiff. parasite material have been received from W. F. Sellers, Oberpullendorf, Austria. The species of parasites received and the emergence through June 30 is given in the following table:

Species	Material received	Emergence through June 30
Lypha dubia Fal.	3,412 puparia	--
Actia nudibasis Stein.	794 puparia	442
Copidosoma geniculatum Mayr.	100 larval skins with C. geniculatum pupae	189
Orgilus obscurator (Nees)	107 cocoons	--
Cremastus interruptor Grav.	104 cocoons	--
Pimpla sp.	900 pupae	85
Ephialtes examinator Fab.	124 pupal skins	41

A colony of 10,675 Tetrastichus turionum Hartig, a pupal parasite of the pine shoot moth, was liberated at Fairfield, Conn., on June 20.

Parasites of birch sawfly.--Parasites of the birch leaf mining sawfly (Phyllotoma nemorata Fall.) received last fall from Austria, have been issuing during June. The following colonies of parasites have thus far been liberated:

Locality	Species	Liberations
Eustis, Maine	Chrysocharis laricinellae Ratz.	500 males; 1,440 females
Do	Chrysocharis sp.	25 males; 150 females
Do	Epiurus conquisitor (Say)	50 mated females
Stark, N. H.	Chrysocharis laricinellae	500 males; 1,220 females
North Andover, Mass.	do	267 males; 238 females

About 1,200 males and 800 females of Phanomeris phyllotomae Muesebeck, and about 40 males and 25 females of Tranosema pedella Holmg. have issued through June 30. Mr. Dowden reports that a male of Rogas unicolor Nees, a parasite of the satin moth, was reared for the first time. The species, as previously noted, produces females from both mated and unmated stock. The male came from the egg of an unmated female.

Use of derris against willow leaf beetle and elm leaf beetle.--S. F. Potts, Melrose Highlands, reports practically 100-percent control of the imported willow leaf beetle (Plagiodera versicolora Laich.) by an application of a 1-to-500 dosage of derris with linseed oil added as an adhesive. Eggs, larvae, and adults of this beetle are easily killed by derris, but the species is very resistant to lead arsenate. The willows used in these tests were rather heavily infested with the spittle insect Aphrophora salicis DeG. and it was found that excellent control of this pest was obtained by the application of derris. Mr. Potts also reports practically complete control of elm leaf beetle adults and eggs by using 1-to-500 derris with linseed oil as a sticker. Equally good results were obtained with nicotine sulphate with a pine tar soap spreader added. In addition to controlling the elm leaf beetle, several other insects, including sawflies, beetles, gypsy moth larvae, and geometrid larvae, were killed by the derris. Later tests to control the larvae of the elm leaf beetle showed that the 1-to-500 dosage of derris gave practically complete kill. Excellent results were also obtained in killing the larvae with a 1-to-500 concentration of nicotine tannate plus linseed oil as a sticker.

Balsam woolly bark louse.--Mr. Potts reports that complete or nearly complete control of the balsam woolly bark louse (Adelges piceae Ratz.) was obtained by using lime sulphur at concentrations of 1 to 9 and 1 to 20. Good but not complete control was obtained by using 4 percent concentrations of two commercial preparations. Trees were sprayed early in the spring and thus far no injury has been observed.

Experiments with gypsy moth larvae.--W. L. Baker, Melrose Highlands, submits the following table which gives the average length of life of gypsy moth larvae in the first four instars when deprived of both food and water and when deprived of food only:

Instar	Average length of life when deprived of--	
	Both food and water	Food only
	Days	Days
First	6.40	9.90
Second	6.65	9.04
Third	4.12	4.89
Fourth	8.46	9.41

The data for fourth-instar larvae are not exactly comparable to those for the previous stages in that they were field collected, whereas the previous instars were reared in the laboratory. It is interesting to note that the absence of water decreased the average length of life from 10 percent in the fourth instar to 35 percent in the first. Mr. Baker advances the opinion that this may possibly be an explanation as to why feeding is noticeably more rapid in an environment of high temperature and low humidity. The feeding impulse is possibly stimulated by the loss of moisture, rather than from a desire to feed.

Control of spruce needle miner.--J. C. Evenden, of the Coeur d'Alene, Idaho, laboratory, reports a successful method of controlling the spruce needle miner (Taniva albolineana Kearf.) in small ornamental trees. In the spring of the year, before the leaf buds have opened, a strong stream of water is used to wash down the masses of dead needles among which the larvae are hibernating from the limbs. These needles should be washed downward so that the debris can be raked up from the base of the trees and subsequently burned or otherwise disposed of. Two seasons of testing this method seem to indicate that it is sufficiently successful to warrant its recommendation.

Control of the mountain pine beetle in Idaho.--W. D. Bedard, Coeur d'Alene, reports that the sixth season of control work against the mountain pine beetle in the white pine stand of the Coeur d'Alene National Forest was conducted during May and June. The N. I. R. A. camps of 32 men each and four C. C. C. camps were utilized in the treatment of approximately 3,000 infested trees on an area comprising 10,838 acres. During this project 7,150 C. C. C. man-days were used, which required an additional 1,100 man-days on the part of facilitating personnel employed as chief spotters, compassmen, crew foremen, and other special workers.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Gypsy moth control in New England and Pennsylvania.--Spraying in the barrier-zone section of New England started in Berkshire County, Mass., and in Litchfield County, Conn., on June 3. During this period 1,746 acres of woodland were sprayed in Massachusetts and 1,800 acres in Connecticut. In the Pennsylvania infested area spraying, which was begun in the latter part of May, was continued throughout June. In that State 3,970 acres of woodland, 3,080 properties in residential sections, and 3,495 isolated trees were sprayed. At a number of infestations in Massachusetts, Connecticut, and Pennsylvania burlap bands were applied to trees at infested sites that will be patrolled regularly for the purpose of killing gypsy moth larvae congregated under them. In the two New England States over 4,000 of these bands were applied and in Pennsylvania more than 75,000 bands were placed on trees. On June 30 all per diem employees on regular work were dropped but two county gypsy moth projects in Pennsylvania were not discontinued at that time. This year at many of the larger infestations the initial defoliation was not in the same spots where it occurred last year, but the following migration took the larvae back into areas completely stripped last year so that many of them have been stripped 2 years in succession. Throughout these badly infested areas numerous species of trees have suffered heavy defoliation. In addition to the most favored food plants, such as the oaks, severe defoliation has been particularly noticeable on the pines and hemlocks and also on such species as paper birch, beech, and sugar maple, which are classified as northern hardwoods and which have sometimes been considered as not being particularly favorable food for gypsy moth larvae. A list of names of men qualified for positions as foremen on gypsy moth crews was prepared at the Greenfield office and sent to the proper State officials in New Hampshire, Vermont, Massachusetts, and Connecticut. The positions for C. C. C. camps are based on the numbers of enrolled men that have been promised by the State officials for gypsy moth work. They are as follows: In New Hampshire, 220; Vermont, 1,240; Massachusetts, 1,070; Connecticut, 890. The work of applying burlap by C. C. C. camp men progressed satisfactorily. Application of burlap bands was nearly completed by the end of June and is resulting in the killing of large numbers of caterpillars at some of the infestations. Approximately 120,000 yards have been put up in Connecticut; 70,000 in Massachusetts; and 50,000 in Vermont. New men coming into the camps at the end of June resulted in some of the gypsy moth crews being brought up to their full quota so that there was an increase of men on gypsy moth work over the number thus engaged earlier in the month. The work at the burlap bands is at its height; over 800,000 caterpillars have already been crushed. The new camps which are being built and which are to be practically 100 percent gypsy moth camps are rapidly approaching completion and the men will probably be put into them within a week or two.

PLANT DISEASE CONTROL

Ribes eradication in the Inland Empire.--Ribes-eradication work in the Inland Empire is now under way with 3,878 C. C. C. members engaged in protecting the valuable white pine stands of that region from the white pine blister rust. In addition, the State of Idaho has two 30-man camps whose members are employed on this work.

C. C. C. blister rust control work in the Northeast.--An average of 2,231 enlisted men and 211 technical foremen and checkers from 81 C. C. C. camps were engaged in the eradication of Ribes in the Northeastern States during May. A total of 1,980,395 wild and 4,007 cultivated Ribes were removed by these workers from 47,821 acres, with a total of 24,929 man-days of labor. It is expected that Ribes-eradication work will be carried on this season from approximately 150 established C. C. C. camps in this region, and tentative plans have been made for such work from 19 new camps, which will probably be established in July.

Blister rust control work on Indian reservations in Wisconsin.--Approximately 90 Indians have recently been engaged in blister rust control work on the Menominee Indian Reservation. The quality of their work has been good and, considering the heavy concentrations of Ribes encountered, progress is satisfactory. On the Bad River Indian Reservation 108 Indians are employed on Ribes-eradication work to protect valuable white pine stands on that reservation.

Pine infection found in Oneida County, Wis.--T. F. Kouba, State leader in blister rust control work in Wisconsin, reports the finding of a heavy pine infection center in Oneida County. Investigation disclosed the presence of numerous Ribes cynosbati bushes within the stand, also 52 R. nigrum bushes, approximately 1/2 mile from the pine, which were later removed with the consent of the owner. No other pines within 50 miles of this infection center are known to be infected with blister rust.

Stem rust situation in the spring-wheat area as of July 10.--Rust observations made in the spring-wheat area on and immediately prior to July 10 indicated that the intensity of the stem rust epidemic in South Dakota, Minnesota, and North Dakota is increasing daily. Approximately 17 consecutive days of weather ideal for the spread of the fungus has also retarded the maturing of grains resulting in prospects for rust damage to the spring-wheat crop beyond anything experienced since 1916. Heavy damage approaching complete ruin of Marquis wheat in some areas of northeastern South Dakota, western Minnesota, and eastern North Dakota is expected. Ceres, although showing more resistance than Marquis, is rusting heavily in some areas and at least some damage is certain. On July 10 heavy rust infection had not progressed farther north than Wahpeton, N. Dak., further indicating the gradual movement of the epidemic from south to north. However, the crops in the vicinity of Fargo and north to the Canadian border are somewhat later than in southern Minnesota and eastern South Dakota, where rust is now so abundant, and, unless a change in weather retards the rapid spread of the disease, heavy rust infection may be expected throughout the Red River Valley. It is estimated that approximately 75 percent of the spring-wheat acreage in northeastern South Dakota, western Minnesota, and eastern North Dakota is planted to Ceres. Although this variety is rusting heavily in some localities, it is showing more resistance than Marquis, making an estimate of the total reduction in yield somewhat problematical.

Progress in barberry-infested areas in Iowa.--With the completion of the Public Works program in connection with barberry-eradication work in Iowa on June 30, D. R. Shepherd, in charge of the work in that State, reports that since August 1933, 3,372 square miles of territory in 33 counties have been given an intensive survey and that more than 50,000 barberry bushes were destroyed on 1,251 properties. Two hundred and eighty-four men worked a total of 16,900 man-days. Mr. Shepherd states, "Many large wild areas of barberry bushes had become established in Iowa since the first barberries were planted in the State in 1840. * * * As a general rule, the areas have been located in the heavily wooded parts of the State where the topography of the land and the dense underbrush have made thorough surveys with small crews of men practically impossible." It is in areas of this kind that the use of labor employed with Public Works funds has proved particularly valuable.

COTTON INSECT INVESTIGATIONS

Pink bollworm parasites from Hawaii received at Presidio, Tex.--L. W. Noble and W. T. Hunt, Presidio, Tex., report that a shipment of parasites forwarded from Honolulu, Hawaii, by O. C. McBride reached Presidio on June 16. In spite of the fact that this shipment was delayed en route, was shipped from San Pedro, Calif., by railway express instead of airmail, the cover or wrapping had been lost or removed, and the water placed in the cages in vials with cotton wicks had completely evaporated, some of both species of parasites shipped were still alive when they reached Presidio. When the shipment left Honolulu it consisted of 109 adults, 474 pupae, and 219 larvae of *Microbracon mellitor* Say and 63 adults of *Chelonus blackburni* Cameron. Upon arrival at Presidio approximately 100 of the 802 *M. mellitor* were still alive and all had reached the adult stage, and 5 of the C. blackburni--1 male and 4 females--were still alive. Sufficient oviposition to maintain breeding stock of this Hawaiian pink bollworm strain of M. mellitor was obtained and it is hoped that C. blackburni may also become established at the Presidio laboratory from the small number of individuals that reached there alive.

Microbracon hebetor Say interferes with work at the Presidio insectary.--L. W. Noble and W. T. Hunt, Presidio, report that Microbracon hebetor Say is interfering with rearing work in the laboratory. It is difficult to exclude the females of this species from host larvae parasitized by other species, Microbracon kirkpatricki Wilk. and M. brevicornis Wesn., and also from containers in which larvae of the Mediterranean flour moth are being reared for host material.

Pink bollworm parasites from Egypt reach Presidio in 16 days.--L. W. Noble and W. T. Hunt, Presidio, report concerning a shipment of pink bollworm parasites received at New York by C. P. Clausen of the Division of Foreign Parasite Introduction, and reshipped by him to Presidio. They state: "This shipment of parasites was forwarded by H. D. Smith from Giza, Egypt, on May 15 and reached Presidio on May 31. It consisted of 396 pupae of Elasmus sp. and 462 cocoons of Exeristes roborator Fab. The parcel was forwarded from New York via airplane to El Paso, Tex., and from there was taken to Presidio via automobile. No emergence occurred en route. A few of the E. roborator specimens were in the larval stage on arrival at Presidio. These and some of the pupae were placed in cold storage to be kept for later use in breeding work. About 50 pupae were allowed to complete development and emerge as adults. From these another generation is being bred, using the same breeding technique as that employed previously with the European corn borer strain of this species. At present only about 50 individuals of the generation reared at Presidio have pupated. The sex ratio of this strain seems to be better than that of the corn borer strain bred on pink bollworms. The sex ratio cannot be accurately determined, however, from the small number of individuals that have pupated thus far. The Elasmus sp. began emergence the second day after arrival at Presidio and practically 100 percent of the specimens emerged within a few days. Oviposition was obtained on pink bollworms wrapped in cotton fibers as recommended by Mr. Smith. The females also deposited eggs on worms in cotton blooms. An attempt is being made to develop a more satisfactory method for large-scale breeding. At present the method showing most promise seems to be that of allowing the females to oviposit through a coarse mesh cloth held firmly against the host larvae and confining them in a container. Oviposition has been obtained by this method, using a pint fruit jar for an oviposition cage and a stender dish for containing the host larvae, but it is believed that a larger cage and a larger container for the larvae would be more satisfactory. A second shipment of Elasmus sp. forwarded by Mr. Smith from Hyeres, France, on June 8, was received at Presidio on June 24. Only 2 adults had emerged on arrival and most of the remaining 62 pupae completed development and emerged within a few days."

Insecticides used to control beet armyworm.--Many farmers sprayed their cotton with calcium arsenate at the rate of 8 to 10 pounds to 50 gallons of water. Observations showed that this gave some control. A test was conducted using poisoned-bran mixture when the larvae were migrating in large numbers from alfalfa stubble into cotton. The formula used was 25 pounds of bran, 1 pound of sodium arsenite, 2 quarts of molasses, and from 3 to 5 gallons of water. This mixture was applied just before dark at the rate of 10 pounds per acre. Many migrating larvae were killed, but it resulted in only a slight degree of control to larvae already on the plants. The bran dried out rapidly and was not effective for more than 2 days. Some farmers attempted to check the worms by flooding the cotton fields, entirely submerging the plants, but this was not effective, as many worms were found on the plants soon after the irrigation. Two species of parasites were obtained from the larvae of the beet armyworm--a tachinid determined by H. J. Reinhard, of the Texas Agricultural Experiment Station, as Achaetoneura archippivora Will. and a braconid determined by C. F. W. Muesebeck as Chelonus texanus Cress. During the latter part of May the larvae were found to be dying off in large numbers in the fields. This may have been due to some fungous or bacterial disease. An attempt will be made to determine the causative organism. No further injury was anticipated during this season, as the disease was proving very effective and the parasite population was rapidly increasing.

Survival and emergence of Exeristes roborator Fab.--L. W. Noble and W. T. Hunt, Presidio, report concerning the parasite Exeristes roborator Fab. that was obtained in 1932 from the corn borer laboratory at Monroe, Mich., and has been reared since then on the pink bollworm in the insectary at Presidio. For convenience this has been referred to as the corn borer strain of E. roborator Fab. Messrs. Noble and Hunt state: "A total of 318 adults emerged in hibernation cages from long-cycle larvae reared in the laboratory and placed in the cages last fall. The main purpose of the hibernation test was to determine the time and rate of emergence in the spring. The short-cycle type, or those in the pupal stage when placed in the cages, began emerging on February 11. This type, however, if breeding in the field would probably emerge before winter temperatures stopped development and therefore the adults from this type were not included in the total emergence. Emergence from the long-cycle type began on March 8 and ceased on April 25. The peak of emergence occurred about March 25. Last year no emergence was obtained after April 13. The winter mortality this year was not determined, as the number of larvae placed in the cages was not known. The mortality in tests conducted during the previous winter, however, was slightly less than 20 percent. No emergence was obtained this spring from approximately 20,000 open bolls collected after frost last fall at the point of the 1933 liberation."

Boll weevil survival in hibernation cages at Tallulah, La.--G. L. Smith et al. reported that in the 70 cages in which 35,000 boll weevils were installed during October and November 1934 there were 73 active weevils during April 1935, as compared to 1,283 in similar cages in April 1934, 49 during April 1933, and 2,788 during April 1932. Beginning on May 6 all boll weevils were removed daily from the cages as they emerged. During May and June 37 weevils emerged, or 0.11 percent, which is the lowest survival in the cages during the past 4 years.

Boll weevils fly against the wind.--At Tallulah three revolving flight screens were in operation during April, May, and June 1935. These screens move with the wind, one side always facing the wind. During this 3-month period, G. L. Smith et al. report that 10 weevils were taken on the windward side and 64 on the leeward side of the screens.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Trap-plot cotton in the Big Bend area of Texas.--The number of blooms produced in the trap-plot cotton in the Big Bend has continued to increase each week throughout June. The first blooms occurred on about the same date this year as last but, because of cool weather early in the growing season, the cotton was somewhat retarded and considerably fewer blooms were produced than last season. In the Castolon district, in Brewster County, 84,931 blooms and 7,797 pink bollworms were found during June, as compared with 163,460 blooms and 1,295 worms for the same period last year, a considerable increase in the number of worms. In the Presidio district there was also a considerable increase in the number of worms this season but not as great as in the Castolon district. For the month 36,518 blooms and 3,264 worms were collected, as compared with 64,106 blooms and 2,208 worms last season. The La Junta farm was perhaps the most heavily infested last year, and a comparison of the results for June each year is rather interesting. From one plot 3,610 blooms and 213 worms were collected in 1934, and 6,434 blooms and 756 worms this season. Another plot had 3,070 blooms and 730 worms last year as compared with 2,771 blooms and 336 worms this year. A third plot contained 3,073 blooms and 630 worms last year, as compared with 3,282 blooms and 184 worms this year, and a fourth plot had 3,789 blooms and 65 worms last year, as compared with 3,227 blooms and 35 worms this year. The above figures would seem to indicate that the infestation on the La Junta farm is perhaps lighter this year. The most interesting plot is located on the Childers farm. This farm was heavily infested in 1930 and 1931, but no cotton was planted in 1932 and 1933. Cotton was again planted in 1934, and for the month of June the trap plot showed 2,352 blooms and only 5 worms, whereas this year the plot showed 5,802 blooms and 1,505 worms. From all of the Big Bend plots 121,449 blooms and 11,061 worms were collected during June, as compared with 227,566 blooms and 3,503 worms for the same month last season. This large increase does not mean that the control program is any less efficient, but is in all probability due to seasonal fluctuation, as conditions this year must have been especially favorable for the pink bollworm. The first worms were found in the field cotton at Castolon on June 17, whereas last year worms were found in the field cotton on June 20; but very few field inspections have been made, as the plot cotton is requiring all the inspectors' time.

Pink bollworm control in Florida.--The survey for wild cotton on the east coast of Florida has been completed. The men worked as far northward as any cotton would be likely to occur. Other than the small colony located near Grant, which was previously known to exist, no wild cotton was found along the east coast. It is encouraging to know that in only a few instances were conditions found that would be at all suitable for the growth of wild cotton. Incidentally, the colony at Grant was again recleaned.

During the period June 11 to 22, a survey was made of the Bahama Islands, some 50 miles east of Florida, to determine whether or not wild cotton was present and, if so, the condition of infestation. Not all of the islands that make up this group were covered but the survey was thorough enough to determine that cotton is present and some of it is infested. All of the cotton found was of the domestic type and there were only a few plants in each location, these locations being around homes and old homesites. Pink bollworm infestation was found in the few plants present on the Berry and New Providence Islands. The elevation, character of soil, and vegetation are such that one would not expect wild cotton to be indigenous to these islands. Even though infestation is present, there is small possibility that there will be much increase, owing to the small number of cotton plants; consequently this small infestation is not likely to be a menace to the United States.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Paradichlorobenzene effective as a fumigant for seed sweetpotatoes.--K. L. Cockerham and O. T. Deen, of the Biloxi, Miss., laboratory, report that when paradichlorobenzene was used at the rate of 1 ounce for each 50 pounds of potatoes in barrels a total mortality of sweetpotato weevil larvae, pupae, and adults was obtained in 21 days. In storage banks dosages of 1½ and 1 ounces of paradichlorobenzene per 50 pounds of potatoes were required to obtain complete mortality in 21 and 28 days, respectively. In plant beds a dosage of 3 ounces per 50 pounds of potatoes gave 98.8 percent weevil mortality in 21 days. Subsequent observations of the seed potatoes used in these treatments indicated that the germination was retarded slightly, but that the number of total plants produced from the seed was not reduced.

Devil's shoestrings root effective against cabbage worms, tests indicate.--R. E. Campbell, of the Alhambra, Calif., laboratory, reports that recent tests with the finely ground root of devil's shoestrings (Cracca virginiana L.) have demonstrated that this material is very effective against the larvae of the imported cabbage worm. Samples of this material (undiluted) containing 0.17, 0.27, and 0.39 percent of rotenone, respectively, at a dosage of 1 gram per plant, gave average kills of larvae of Ascia rapae L., ranging from 89 to 94 percent, which compared favorably with results from derris root powder containing 0.2 percent of rotenone applied in the same manner and at the same dosage. Applications of the same strengths of devil's shoestrings root at a dosage of 1/2 gram per plant gave very satisfactory kills, ranging from 85 to 87.5 percent. When the same strengths were diluted with 3 parts of talc and applied at a dosage of 1 gram per plant, the percentage of A. rapae larvae killed ranged from 57.5 to 82.5 percent.

Determinations of pH on derris root powder, cube root powder, and various inert carriers give interesting results.--L. W. Brannon, of the Norfolk, Va., laboratory, reports upon pH determinations(made by Dr. J. B. Hester, soil technologist, of the Virginia Truck Experiment Station) on derris root powder, cube root powder, and various inert carriers with these organic insecticides, as follows:

Material	pH of sample
Derris root (containing 3.6 percent rotenone)	5.6
Cube root (containing 5.2 percent rotenone)	6.1
Commercial mixture A (0.55 percent rotenone) (with talc)	7.3
Commercial mixture B (0.75 percent rotenone) (with talc)	7.3
Carriers	
Clay	4.7
Tobacco dust	5.8
Diatomaceous earth	6.25
Bentonite	6.9
Infusorial earth	7.1
Talc	8.3

From the above tabulation it will be noted that the powdered derris root and cube root are acid in reaction. Also, it will be noted that all of the carriers listed, except the last two, are acid in reaction. The infusorial earth is slightly alkaline, and the talc gives a slightly higher alkaline reaction than does the infusorial earth. The literature on recommendations for the use of derris has specified that a nonalkaline or neutral or slightly acid carrier should be used, in order not to decompose the derris. Accordingly, it appears that poor control may be expected from a derris-talc mixture containing 0.75 percent rotenone. However, in the 1934 field-control experiments against the Mexican bean beetle in Virginia, this mixture gave an increase in yield of approximately 74 percent as compared with the untreated plots, and the treatment caused an increase of 85 bushels of snap beans per acre, with excellent foliage protection against the bean beetle. In this instance the derris was apparently not decomposed appreciably by the alkaline carrier (talc--pH 8.3). It is probable that decomposition is much less likely to occur in dust mixtures than in spray suspensions and, despite its alkaline reaction, talc will continue to be of no particular menace to derris or cube with which it is mixed. Apparently it is only in instances where carriers with a large alkaline reserve, such as lime, bordeaux mixtures, and soaps are used that any appreciable decomposition of the active ingredients of derris and cube may be expected.

Derris and cube about equally effective in controlling imported cabbage worm.--C. B. Wisecup and J. P. Vinzant, of the Sanford, Fla., laboratory, report that in an extensive series of laboratory tests, utilizing a precision duster, dust mixtures of derris and cube powders, respectively, containing equivalent percentages of rotenone and total extractives, proved equally effective in killing quarter-grown and half-grown larvae of the imported cabbage worm. A total of approximately 1,080 quarter-grown larvae and an equal number of half-grown larvae were used in these tests. In each of the experiments three samples of derris and three samples of cube were diluted to 0.1 percent of rotenone content for quarter-grown larvae and to 0.5 percent of rotenone for the half-grown larvae.

Derris dust the best general insecticide for cabbage worm control.--As the result of an extensive series of experimental field tests at the Baton Rouge, La., and Charleston, S. C., laboratories during the spring of 1935, C. E. Smith and W. J. Reid report that derris dusts containing from 0.5 to 1.0 percent of rotenone are equal or superior to all other materials or dilutions tested as insecticides for the control of the three major cabbage worm species present, i. e., Autographa brassicae Riley, Ascia rapae L., and Plutella maculipennis Curt.

Barium fluosilicate gives best results in control of grasshoppers in tobacco fields.--F. S. Chamberlin, of the Quincy, Fla., laboratory, reports that in comparative tests with barium fluosilicate, natural cryolite (sodium fluoaluminate), derris root, and standard poisoned bait, the barium fluosilicate, diluted with tobacco dust (2-8) and dusted on the plants at the rate of 5 to 6 pounds per acre, gave the most effective results of any of the materials tested. Natural cryolite diluted with tobacco dust (2-8) and dusted on the plants at the rate of 5 to 6 pounds per acre gave approximately the same control as the standard grasshopper bait applied to the soil surface between the rows of plants at the rate of 10 pounds, dry weight, per acre. The derris dust mixture, containing 0.75 percent of rotenone with tobacco dust as a diluent, exerted very little control when dusted on the plants at the same dosage used for barium fluosilicate and natural cryolite. No burning of the foliage resulted from the application of any of the dust materials. The principal species of grasshoppers involved in these tests were Melanoplus femur-rubrum propinquus McN. and M. mexicanus Sauss.

Calcium arsenate most effective insecticide against strawberry weevil, tests show.--W. A. Thomas and L. B. Reed, of the Chadbourn, N. C., laboratory, report that in insecticide experiments directed against the strawberry weevil, calcium arsenate and dusting sulphur (1-5) proved superior to any of the other materials tested in reducing the number of weevil-cut buds, thus corroborating the results of similar experiments in previous years. Derris dust mixtures containing from 0.5 to 1 percent of rotenone, respectively, with clay as a diluent, gave fairly satisfactory results when applied to the plants after the berries began ripening. A pyrethrum dust mixture containing 0.1 percent Pyrethrin I was effective in reducing the number of weevil-cut buds, but at this strength it was inferior to the derris root powder and its present cost precludes its general use as an important insecticide for strawberry weevil control. Neither derris nor pyrethrum showed any evidence of injury to the fruit or foliage, but the calcium arsenate-sulphur dust mixture gave some evidence of foliage injury.

Promising results obtained with derris root against tobacco flea beetle.--J. U. Gilmore, of the Clarksville, Tenn., laboratory, reports that field experiments in tobacco plant beds during the present season have corroborated results obtained previously to the effect that a derris dust mixture containing 2 percent of rotenone, with tobacco dust as a diluent, gave satisfactory results in controlling the tobacco flea beetle. Paris green and arsenate of lead, though exerting a fair control, were not as effective as derris, and cryolite (sodium fluoaluminate) was less effective than either of the previously mentioned materials. On newly set tobacco, promising results were obtained with dust mixtures containing 0.55 percent of rotenone, with tobacco dust as a diluent. This material freed the plants of flea beetles within 2 hours, but the effectiveness was not as prolonged as when a dust mixture containing 2 percent of rotenone was applied.

INSECTS AFFECTING MAN AND ANIMALS

Screw worm control measures in Southeastern States appear to be checking pest.--Because of the educational work carried on by the Bureau in the States of Georgia, Alabama, Mississippi, and Louisiana during the fall of 1934 and similar work started again this spring in these States before the fly population had had the chance to increase, the number of infested animals has apparently been kept very low. Reports from 222 counties in South Carolina, Georgia, Alabama, Mississippi, Texas, and Louisiana for the week ended June 29 show only 1,132 cases in 499,184 animals examined, and only 27 deaths. In Florida, where the fly was more or less active all winter and a large population was established before control measures were undertaken by the Bureau, 23,724 infestations occurred in 439,781 animals during the last week in June. Approximately 23,000 gallons of pine tar oil and 15,000 gallons of benzol have been distributed to the various counties in the Southeast where the campaign is being waged. Ranchmen in southwestern Texas report that screw worms are worse this season than for many years past. This area is outside the region where the present campaign is being waged.

Sulphur dips promising for control of the sheep tick and various species of sheep and goat lice.--In June O. G. Babcock, of the Sonora, Tex., laboratory, conducted experiments at the Navajo Indian Reservation, Gallup, N. Mex., to find suitable methods of controlling Melophagus ovinus L. and red lice, blue lice, and foot lice that had heavily infested the flocks belonging to Indians living on the reservation. Thylox sulphur dust and 300-mesh wettable sulphur at the rate of 10 pounds per 100 gallons of dip were used in these tests. Although final results of the tests have not been obtained, preliminary checks indicate that a high percentage of kill was effected.

Eye-gnat control work resumed in Coachella Valley, Calif.--On account of the recent severe outbreak of Hippelates pusio Loew in the Coachella Valley, the residents of this district have renewed their efforts to maintain a systematic control campaign against this pest along the lines recommended by the Bureau. Several years ago the residents of the valley organized a gnat-abatement district for the purpose of controlling the fly; however, owing to lack of funds and loss of interest probably resulting from decreased fly activity, the work had not been properly kept up. R. W. Burgess, of the Uvalde laboratory, who was sent to investigate the problem, now reports that the abatement district has been reorganized and provisions have been made to operate the gnat traps systematically during the coming year.

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Five larvae of the Mediterranean fruit fly (*Ceratitis capitata* Wied.) were intercepted at New York on March 26 in four loquat fruits in baggage from Portugal. This fruit fly has been taken previously in loquats from the Azores and Madeira Islands. Living larvae of the West Indian sweetpotato weevil (*Euscepes batatae* Waterh.) arrived at Philadelphia on May 17 in a sweetpotato in stores from Puerto Rico. A living specimen of *Dermestes peruvianus* Casteln. was taken at San Francisco on March 18 in cacao beans in cargo from Colombia. This dermestid arrived at the same port in 1934 with hides from Argentina. A living specimen of *Tenthecoris bicolor* Scott was intercepted at Honolulu, T. H., on November 15, 1934, on an orchid (*Cattleya schilleriana*) in cargo from Brazil. A living specimen of the earwig *Labia arcuata* Scudd. was taken at Galveston, Tex., on April 29 with banana debris in cargo from Guatemala. This species is not recorded from the continental United States. A living specimen of *Lygaeus pallidocinctus* Stal arrived at Brownsville, Tex., on April 23 on a carnation flower in cargo from Mexico. A living larva of the tomato pinworm (*Gnorimoschema lycopersicella* Busck) was intercepted at Nogales, Ariz., on April 14 in the fruit of a bell pepper in cargo from Mexico. This represents the first record in our files of this gelechiid being intercepted in pepper. A living specimen of *Pachylis hector* Stal was taken at San Pedro, Calif., on March 26 on bananas in cargo from Panama. A living larva of *Psylliodes chrysocephala* L. was intercepted at New York on April 25 in a radish root in stores from Italy. This chrysomelid has arrived previously in brussels sprouts, carrot, rutabaga, and turnip from Europe, in turnip from Africa and the Canal Zone, and in radish from Denmark. Living specimens of the whitefly *Dialeurodes chittendeni* Laing were taken at Seattle, Wash., on March 18 on the leaves of a rhododendron plant in cargo from England. A living specimen of *Xestocoris collinus* Dist. arrived at Honolulu, T. H., on August 29, 1934, on an orchid (*Stanhopea bucephalus*) in cargo from the Canal Zone. A living larva of a turnip mud beetle, *Helophorus rugosus* Oliv. or *H. porculus* Bedel, was intercepted at Houston, Tex., on March 15 in a turnip in stores from England. This hydrophilid is recorded from England, Scotland, and Wales. The leaves are eaten, the leafstalks are tunneled, and the turnips are gnawed and tunneled on the outer surface. The damage is done by both beetle and grub.

Pathological interceptions of interest.--The following determinations were recorded during the month: *Claviceps microcephala* (Wallr.) Tulasne intercepted at Washington May 29 on *Briza media* from Roumania, the first time for this host and country; *Colletotrichum orchidearum* Allesch. at Washington on May 31 on *Pleurothallis gelidanall* from Dominican Republic, the first time for this host and country; *Colletotrichum pisi* Pat. at New York on May 9 on peas from Italy, the first from Italy (see note on p. 5 of Plant Quarantine News Letter for Dec. 1932); *Helminthosporium ravenelii* Curtis on April 24 at New York on *Sporobolus poiretii* (R&S) Hitch., the first interception from Mexico and first since 1920; *Heterosporium* sp. (*H. allii* Ell. & M.?) on April 1 at New York on onions from Chile, the first for this host and country; *Monilia* sp. (similar to *M. sitophila*) May 17 at New York on bamboo stems, origin unknown; *Mycosphaerella musae* (Speg.) Syd. on

June 3 at New York on banana leaves from Puerto Rico, first interception; *Nigrospora oryzae* (B. & Br.) Petch, on April 11 at New York on rice heads from French Morocco, first interception of genus; *Ophiobolus graminis* Sacc. on April 18 at New York on wheat straw from France, first interception; *Sphacelotheca panici-leucophaei* (Bref.) Clinton on April 29 at New York on *Trithacline insularis* from Puerto Rico, first interception; *Vermicularia capsici* Syd. on June 2 at Philadelphia on hot pepper from Java, the first time from Java, spores not altogether typical.

New garlic disease.--An undetermined species of *Helminthosporium* was intercepted on garlic at various ports but the specimens were inadequate for study. Finally a series of specimens was held on arrival until enough had accumulated to enable J. A. Stevenson to make a study of the fungus, which was found to have been published as *H. allii* Campanile in 1924 (Ann. Agr. Min. Econ. Naz. Italy 4:87-106). The material held was from Chile taken at New York on April 13 and May 24; from France, taken at Mobile on April 26; from Italy, taken at Mobile on April 24; and from Mexico, taken at Laredo on May 14, at New Orleans on April 17, and at New York on May 7.

Inoculated wheat intercepted.--A packet of wheat seed from Australia was found on inspection at Washington to bear spores of the flag smut fungus *Urocystis tritici* Koern. Investigation disclosed that the wheat was of a variety supposed to be free from this disease but that it had been purposely inoculated and addressed to a wheat breeder in a Pacific coast wheat area, where flag smut does not occur, for testing. The wheat was not forwarded.

Flag-smut twin intercepted.--Inspection of straw covers of bottles of cordials from Italy were found to have occasional aborted heads bearing black masses of spores which examination disclosed were similar to those of *Urocystis tritici*. A long and tedious examination by specialists in Washington revealed that the host was rye and hence the disease was stem-smut, *U. occulta* (Wallr.) Rabh., and not *U. tritici*. The two fungi cannot be separated by examination. The interception was made at Philadelphia on June 20.

Pink bollworm en route from Brazil to Texas intercepted.--Two undeclared packages in baggage from Brazil arriving at New Orleans on May 21 were found to contain cotton seed infested with nine living pink bollworm larvae. According to the passenger this cotton was grown in Brazil from Texas seed to see if the characters of the cotton remained the same under Brazilian conditions. The intercepted seed was being taken into an uninfested cotton-growing section of Texas at a time favorable for the escape and propagation of the pink bollworm.

The fleet comes in.--Arrival of the returning American fleet at San Diego necessitated the assembling of 16 inspectors from Los Angeles, the Mexican border, and intervening ports. Inspection of the 105 vessels and 193 aircraft was accomplished between noon and 7:30 p.m. Owing to the splendid cooperation of the Navy Department, only 15 small lots of overlooked material were found. These included 65 pieces of fruits and vegetables, such as cucumbers, tomatoes, sweet limes, lemons, avocados, and mangoes, and 6 pounds of string beans, all of which were Hawaiian grown. Interceptions of important insect pests included one melon fly (Bactrocera cucurbitae Coq.) and the bean pod borer (Maruca testulalis Geyer).

DOMESTIC PLANT QUARANTINES

Removal of phony peach trees from nursery zones.--Difficulties have been experienced in recent years in effecting the destruction of diseased trees in the environs of nurseries. This has been due to complications between nurserymen and neighbors, the latter failing or refusing to dig up infected peach trees from their premises. These difficulties have apparently been overcome by appealing to the good citizenship of the persons concerned, and by soliciting the influence of leading persons of the community. All the diseased trees found in the course of regular inspection this season have been removed and the owners convinced of the economic advantage of maintaining clean orchards. A disease-free zone of a mile around the nursery is a condition of State certification of peach nursery stock produced in infected counties.

Phony peach disease survey.--An extensive survey in New Jersey and Delaware was recently completed and no phony peach disease was found. A survey that will require from 2 to 3 weeks in Maryland, a State not known to be infected, has been begun by one Federal and one State inspector.

Citrus canker at Alvin, Tex.--Citrus canker infections were recently found on seven properties, including one abandoned nursery containing 3,500 Citrus trifoliata in a locality about 3 miles southeast of Alvin. More trees of this species were found in the vicinity of Alvin than in any other area in Galveston and Brazoria Counties. All the infected trees, as well as all other citrus on the properties concerned, were destroyed with the assistance of laborers paid by the State. Rapidly spreading infections on small seedlings in this locality indicate that the present season has been unusually favorable for the development of the disease.

Interesting interceptions.--Two hundred and nineteen apparent violations of Federal plant quarantines were intercepted in transit inspection in June, as well as 26 intrastate shipments moving in apparent violation of State Japanese beetle and gypsy moth quarantines. In one shipment five species of insects were discovered in a package innocently labeled "hat", consigned to a lady in Baltimore and caught at Boston by the transit inspector who found the contents to be uncertified cut roses from the gypsy moth infested area. Transit inspectors at New York recently intercepted two air-mail shipments of uncertified cut flowers originating in the area infested with the Japanese beetle and consigned to points in Missouri and Indiana. A package of grasshoppers mailed in apparent violation of the Insect Pest Act also came to the attention of New York inspectors and was referred to the appropriate division of the Bureau.

Transit inspection activities.--The inspection of mail, express, and freight shipments at Pittsburgh was initiated on May 3 by an inspector on the Japanese beetle project and that station is proving, as in previous periods worked, a strategic point for the checking of large numbers of shipments from the infested areas. At Saint Paul the cooperative inspection of foreign and domestic shipments, which was temporarily discontinued, was resumed the middle of July. Seasonal inspection at Kansas City was closed on May 20 and at Omaha on June 13.

CONTROL INVESTIGATIONS

Toxicity of arsenates of calcium depends on their water content.--J. W. Bulger, Takoma Park, Md., has determined the approximate median lethal doses for the silkworm of four pairs of arsenates of calcium of known composition. One member of each pair contained water of crystallization and the other was anhydrous or nearly so. Mono-, di-, tri-, and basic arsenates were represented. Six other pairs of arsenates of calcium were also tested, one member of each pair having been autoclaved and the other untreated. It is supposed that autoclaving drove off some of the combined water. In every one of the 12 pairs the hydrated form was more toxic than the anhydrous or heat-treated form, and in some cases no kill was obtained by the highest doses of the heat-treated forms that could be fed. N. F. Howard has already shown that autoclaving commercial calcium arsenate makes dangerous samples safe on bean foliage. It now appears that this treatment will also make such samples harmless to certain insects. An explanation for the reduction of toxicity of the arsenates of calcium by heat treatment will be sought by measuring their rates of solubility in buffered water. This project is being carried out in cooperation with the Insecticide Division.

BEE CULTURE

Measuring brood areas from photographic negatives.--A. P. Sturtevant and C. L. Farrar, of the Laramie, Wyo., laboratory, report very satisfactory results on several F. E. R. A. projects that made student help available through the University of Wyoming. One girl worked 400 hours, during which time she measured from 12 to 13 thousand negatives, about 7 thousand of which were measured a second time. Thirty-five-millimeter negatives of brood combs, made with a Leica camera, were projected so that the brood comb was half normal size. The brood areas of the projected images were measured in two ways: First, the entire area was measured with a planimeter to obtain the number of square inches of brood in all stages, i.e., eggs, larvae, and sealed brood; second, the number of square inches of sealed brood was estimated by counting the number of inches on a tracing board which covered sealed cells, accumulative estimates being made for incomplete squares.

Reports of bees lost through spray poisoning increase.--Reports of loss of bees through spray poisoning have been unusually prevalent this year. Reports of damages from the eastern part of the country have by no means been confined to fruit-growing areas. The Bronx Beekeepers' Association, in a locality where one would suppose there were no bees, found the situation so serious that it appealed to the Bureau for relief. It was found, however, that State agencies were responsible for the spraying and those in charge presumed that there would be no danger of poisoning honeybees. Arrangements are being made now to give the beekeepers' association advance notice of any spraying that is to be done in the future. The Somerset, Md., laboratory received a series of complaints from Shenandoah County, Va., relative to the abnormal death of adult bees. Examination of samples revealed no micro-organisms of any sort. Consequently, C. E. Burnside made a personal investigation and his conclusions were that it was another case of spray poisoning. The orchards in the vicinity are grayish-green with arsenate. The poison is always available, particularly following rains or heavy dews, when the bees seek water from the adhering droplets. Serious damage caused by bees gathering water from sprayed plants has been occurring in the potato fields of the State of Washington, and undoubtedly the same thing occurs in many apple orchards. Beekeepers are awakening to the fact that the renting of colonies to orchardists, even at fair rentals, is an unprofitable business, owing to the weakened condition of many of the colonies at the time they are moved out of the orchards. Sometimes it is impossible for such colonies to build up sufficient strength to gather a surplus crop.

More cases of plant poisoning of bees and brood reported.--Cases of abnormal death of adult bees and brood from plant poisoning appear to be increasing, now that this type of poisoning is very much under suspicion. G. H. Vansell, of the Davis, Calif., laboratory, recently investigated such a case in Orange County, Calif., where a species of *Astragalus* appears to be the cause of the trouble. Another species of *Astragalus* has recently been reported by the Provincial Apiarist of Alberta, Canada. More recently, summer titi (southern leatherwood, he-huckleberry, *Cyrilla racemiflora*), a plant growing in Florida, Georgia, and some of the other Southern States, appeared to be responsible for a condition known as "purple brood." C. E. Burnside, of the Somerset laboratory, and F. E. Foster, State apiary inspector of Florida, have been collaborating in tracing the cause of this abnormal condition of the brood.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

A new bruchid added to the insect-reference collections.--Fragmentary specimens of beetles obtained from *Cytisus proliferus* from France have been placed by H. S. Barber as *Bruchidius mulsanti* Br., a species not previously represented in the reference collections of the National Museum. The specimens were collected at the Washington, D. C., inspection house of the Division of Foreign Plant Quarantines.

Asiatic waterlily feeder recognized.--Specimens of a moth whose larvae are reported to be very destructive to the leaves of ornamental waterlilies (*Nymphaea pubescens* var.), sent in by Eduardo Quisumbing, acting chief, National Museum Division, Bureau of Science, Manila, P. I., have been placed by Carl Heinrich, after correspondence with Edward Meyrick in England, as *Nymphula crisonalis* Walker. This species had not previously been represented in the insect-reference collections of the National Museum.

New record for Triatoma attacking man.--Specimens of a reduviid bug, identified by H. G. Barber as *Triatoma uhleri* Neiva, were reported to be attacking the occupants of a residence in El Paso, Tex. This represents the first record known to Mr. Barber of attacks by this species on man.

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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR JULY 1935

Vol. II, No. 9 (Not for publication) September 1, 1935

FRUIT INSECT INVESTIGATIONS

Notes on dried-fruit insects.--The first results in a proposed series of tests designed to measure the crevices through which insects can gain access to packages of dried fruits are reported by Perez Simmons, of the Fresno, Calif., laboratory. Micro slides with cylindrical wells were arranged in pairs with the depressions facing each other. The wells were baited with insect-free pieces of raisin and walnut. The slides, separated by one, two, or three thicknesses of metal shim 0.04 mm thick, were held together with clamps. By this arrangement accurately measured crevices (0.04, 0.08, and 0.12 mm) gave entrance to the baits. The inner surfaces of the slides were of dull finish to permit newly hatched larvae to crawl upon them. After exposure in pure cultures of the Indian-meal moth and the saw-toothed grain beetle, it was found that the former had infested bait through an opening 0.12 mm wide, but that the saw-toothed grain beetle had failed to gain entrance. Both species infested other baits in slides separated by glass cover slips 0.21 mm thick.

New method of applying tanglefoot in laboratory experiments.--In connection with their insecticide experiments for control of the codling moth, L. F. Steiner and R. F. Sazama, of the Vincennes, Ind., laboratory, have reported a recent improvement in procedure. To prevent entrance of larvae at the calyx and access to the apple from below, it has been customary to apply tanglefoot around the calyx and to the pin on which the apple is placed with a pointed stick. This is a time-consuming task and in order to speed up the operation a new method of application was developed. A supply of new lead tubes similar to those used for applying glue or cement was procured and the tubes were filled in the laboratory with a hot mixture of 1 part liquid tanglefoot and 2 parts tree tanglefoot. They were equipped with pointed nozzles through which the desired amount of tanglefoot could be squeezed as it was applied. Approximately two tubes are required per 1,000 apples. The time saved in one experiment is enough to pay for a year's supply of tubes.

Capture of fruit-moth parasite in bait traps.--Wm. P. Yetter, Jr., Moorestown, N. J., reports that six males of *Diocles molestae* Uch., a Japanese parasite of the oriental fruit moth recently introduced into the United

States, were caught in a bait trap in the Moorestown area. The parasites of the fruit moth are rarely captured in bait traps. This is the first time, according to H. W. Allen, that this parasite species has been recovered in the United States from overwintering material.

MEXICAN FRUIT FLY

Trap catches in July.--For the second consecutive month no *Anastrepha ludens* Loew was trapped in the lower Rio Grande Valley area, although 1 was taken in Laredo and 5 were trapped in two Mexican border towns. Other *Anastrepha* species were trapped on the Texas side of the Rio Grande, as follows: *A. serpentina* Wied., 18; *A. pallens* Coq., 143; and *A. fraterculus* of authors, 9. A total of 3,215 larvae of *A. ludens* and other *Anastrepha* species were found infesting fruit collected from the markets in Matamoros and Reynosa, Mexico.

DATE SCALE CONTROL

Date scale inspection.--The inspection of the Coachella, Calif., district was completed in July and over 90 percent of the plantings were dropped from the inspection lists. Inspection was begun in the Indio district. In the Imperial Valley systematic inspection was continued. The entire infested area has been covered since the first of the calendar year. The limits of the infested area are being narrowed and many plantings are being dropped from the inspection lists.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Heat kills pea aphid in Oregon.--L. P. Rockwood, of the Forest Grove, Oreg., laboratory, reports that a field of Austrian winter field peas that had been seeded late in March or early in April, much too late for Willamette Valley conditions, was examined on July 11 and again on July 15. In the intervening days, maximum temperatures were recorded at Forest Grove, 10 miles west of the field, as follows: July 12, 101° F.; July 13, 106°; July 14, 108°. On July 11 the peas were very heavily infested by *Illinoia pisi* Kalt. They were estimated to average from 8,000 to 10,000 per 100 sweeps of the net, notwithstanding the thin stand and short growth, the peas being from 12 to 18 inches high. Individual tips were crowded with aphids from 3 to 4 inches down from the tips. On July 15, 350 sweeps yielded not a single individual of *I. pisi*. Examination of the ground under the plants disclosed piles of dead dried-up aphids. Syrphid larvae, mostly *Lasiopthicus pyrastri* L., had also been killed. Some living coccinellid larvae were swept but they were thin from starvation. The thin stand and scant foliage of the peas and the thin stand of the companion crop, oats, afforded practically no shade from the hot sun. Not a specimen of *I. pisi* could be found in this field on July 30, when a few plants showed a little new growth, in spite of the great deficiency in soil moisture. An alfalfa field just coming into bloom was swept on the same dates, yielding an average of 100 *I. pisi* per 100 sweeps on July 11 and 30 per 100 sweeps on July 15. Here there was much shade to protect the aphids from the direct rays of the sun and heat killing was of little importance, even if it is assumed that the total reduction in aphid population between the two dates was entirely due to heat.

Collection of Phyllophaga beetles and rearing of grubs.--T. R. Chamberlin and Lee Seaton, of the Madison, Wis., laboratory, report as follows: "Early in July field collections of beetles were made at night in various localities in Wisconsin. Fair catches were made up to July 10 but by the 17th only scattered beetles could be taken. The beetles taken were confined over soil in 1-gallon tin cans, the eggs thus obtained were incubated, and the larvae were stocked in cages of various kinds. A summary of this work shows that to the end of July a total of 7,143 eggs were obtained. Most of the eggs were set to incubate, but a few were preserved. From those set to incubate a total of 2,471 larvae hatched. With the exception of a few that were preserved, these larvae were stocked in cages. Other cages were stocked with eggs only, so that the larvae hatching therefrom would not be disturbed at the time of hatching. The rearing cages at the end of July totaled approximately 50 1-gallon tins, 20 ointment tins, 6 greenhouse flats, and 5 glazed tiles 18 by 30 inches inside measurement. The latter were buried out of doors and filled with grub-free sifted soil. Recent observations have shown a heavy mortality among the larvae, especially during the first few days after setting in the soil. Survival of larvae set in this manner has been best in ointment tins, probably because the proper amount of moisture is more easily maintained in them than in the other cages and because the larvae are better able to keep themselves well in the soil when it is loosely in contact with the lid. Survival appears best where eggs, rather than larvae, are set and where wheat is planted at the time of setting so that when the larvae hatch the soil contains food and is properly broken up; therefore the larvae do not tend to come to the surface and die there."

Bees used for tripping alfalfa in breeding aphid-resistant plants.--R. A. Blanchard, of the Sacramento, Calif., laboratory, reports that on July 16 a small colony of bees, containing four frames and a queen, was placed in a wood-cheesecloth cage 9 by 12 feet in area and 6 feet tall. Fifty alfalfa plants of the F_3 generation aphid-resistant stock were growing in the cage. The plants were judged to be in about one-fourth bloom at the time. Only an occasional flower had tripped when the bees were introduced. Between July 16 and 31, temperatures ranging from 78 to 120° F. were observed at the top of the alfalfa within the cage. At the same time out-of-door temperatures in an instrument shelter were from 14 to 21° lower. Under such conditions and concerning this strain of alfalfa, the following statements can be made: "A very high percentage of the flowers were tripped by the bees. Counts of racemes on which the flowers were all wilting, indicating that they had reached an advanced stage of maturity, showed that 98.2 percent of those remaining on the racemes were tripped. However, of the total flowers on the racemes counted to date, 40.8 percent had fallen off and, while it appears that most of them had been tripped, this point is uncertain. Repeated observation on different days and at different temperatures of 70 bee visits to different flowers showed that an average of 6.7 percent of the flowers were tripped. The estimated total mentioned above indicates that the percentage accumulates probably as a result of repeated visits and stage of maturity of the flowers. The role of temperature, except in influencing the development of the flowers, cannot be definitely stated, owing in part to the limited number of flowers in the cage. At the higher temperatures, however, the flowers appear to trip more easily. On the other hand, the bees seemed to work the flowers harder at lower temperatures. Behavior of the individual bee is an important factor. Some were observed to approach the flower repeatedly from the side, but others alighted on the face of the flower and inserted the proboscis to the base of the staminal column. Flowers were most often tripped by the latter type of visit, although at high temperatures a flower was occasionally tripped by the leg of a bee working to the side."

Further studies on hessian fly resistance in wheat hybrids.--W. B. Cartwright, Sacramento, reports as follows: "In cooperation with the Bureau of Plant Industry, a cross between Dawson and Club wheats has been tested under field conditions in California. On a factorial basis, a tentative interpretation of the genetic data from 135 F_3 rows of the Dawson and Club is that two factors and a 15-to-1 ratio are involved in the cross. This is similar to results obtained with the Dawson and Poso cross. The data indicate complete susceptibility to be recessive. Homozygous resistant lines from the Dawson, Poso, and Club hybrids have been obtained in reseedings and field tests in 1935. Two back crosses have been made to the resistant lines."

JAPANESE AND ASIATIC BEETLE INVESTIGATIONS

Japanese beetle situation in July.--Henry Fox, Moorestown, N. J., reporting on the Japanese beetle situation, states that the feature of most general interest in the infestation of the current year is its marked severity, as compared with that of a year ago. Extensive tracts of major infestation have developed in northern Delaware, in southeastern Pennsylvania, and in the southwestern, north-central, and northeastern parts of New Jersey. Noteworthy are isolated instances of remarkably heavy infestation which have appeared at such places as the Berkshire Country Club near Reading, Pa., and in the residential section of Cape May, N. J., both of which are separated by many miles from the periphery of the general area of heavy infestation.

Japanese beetles a nuisance at bathing beaches.--Mr. Fox reports that a very noticeable cause of public complaint against the Japanese beetle this season has been the abundance of beetles washed up on the shores of bathing beaches during the latter half of July. This situation has been especially annoying along the New Jersey beaches, from the Atlantic Highlands and Sea Bright down to well below Manasquan. Countless masses of beetles were apparently blown out onto the water and then washed back onto the beaches, causing a great deal of annoyance to bathers, as a result of the beetles getting in their mouths, noses, and under their bathing suits. The same situation has also occurred to somewhat less extent along the lower New Jersey beaches from Atlantic City to Cape May, while along those portions of the Delaware River flowing through the heavily infested areas, large quantities of beetles floating in the water have been observed by passengers on ferry boats and pleasure craft of all kinds.

The loss of derris from foliage in the field.--In tests conducted by R. D. Chisholm, Moorestown, samples of sprayed foliage were taken from the blocks of trees in the orchards sprayed with different derris sprays for the protection of early ripening peaches and apples. Samples were taken immediately after spraying and at intervals of 3 and 6 days. After the third application additional samples were taken at intervals of 9, 12, 14, and 18 days.

Three applications of the sprays have been made. Spray combinations used were: II (3 lbs. derris, 1 pt. fish oil, 100 gals. water); III (3 lbs. derris, 3 lbs. rosin residue emulsion, 100 gals. water); IV (3 lbs. derris, 3 lbs. rosin residue emulsion, 10 lbs. magnesium silicate, 100 gals. water). From these determinations, it was found that combination II deposited the least derris, while combination IV deposited the greatest amount. Combination IV in most instances also showed the highest relative amount of rotenone on the leaves, as compared with combination II.

Treatment of evergreen and deciduous nursery stock.--In tests conducted by W. E. Fleming, F. E. Baker, and L. Koblitsky, Moorestown, to determine the absorption of arsenic by nursery plants growing in treated plots, needles from *Picea alba*, *Picea excelsa*, *Picea pungens*, *Pinus mughus*, *Pinus nigra*, *Pinus strobus*, *Pinus sylvestris*, and *Pseudotsuga douglasii*, grown in the experimental plots at the laboratory, were analyzed for arsenic. The following table shows the arsenic content of the conifer needles. The figures in the body of the table are parts of As_2O_3 per million.

Conifer	Lead arsenate dosage per acre		
	1,000	1,500	2,000
	Pounds	Pounds	Pounds
Picea alba	0.625	1.000	1.75
Picea excelsa	.350	.475	1.05
Picea pungens	---	.875	1.62
Pinus mughus	.150	.310	.81
Pinus nigra	.150	1.250	1.40
Pinus strobus	.125	.475	.62
Pinus sylvestris	.150	.300	.40
Pseudotsuga douglasii	72.500	77.500	77.50

No injury was apparent in the above conifers. An examination of the beds planted in May with evergreen seeds, to determine the effect of lead arsenate on the growth of the seedlings, showed that many of the plants in the treated beds were retarded or showed injury. It is apparent from these results that lead arsenate cannot be applied to seed beds for growing evergreen seedlings of these types without causing severe injury to the plants.

Parasitization of Japanese beetles by *Tiphia vernalis*.--During the latter part of June observations were made by T. R. Gardner at the Rushland, Pa., colony of *T. vernalis* Roh., liberated in 1931. This colony is located in a low, partially shaded pasture along a stream. The parasite was present in the field and in the shaded areas grubs were still abundant, although in the open area most of the host population had changed to the prepupal, pupal, and adult stages. A square plot of 10,000 square feet in the partially shaded area was selected near the parasite feeding grounds and 200 1-square-foot diggings spaced equidistant each way representing 2 percent of the area were made. The total host population in the 200 diggings representing grubs, prepupae, pupae, a few newly formed beetles, and present-year parasite cocoons, each of which accounted for a host grub, was 1,046, giving an average of 5.2 per hole dug. Of these, parasite eggs were found on 251 grubs, parasite larvae in various stages of development on 428 grubs, and 23 of the grubs had been entirely consumed by the parasite, which was in the cocoon stage, giving an average of 67.1 percent parasitization for all holes dug. An examination of the parasitized grubs revealed the interesting fact that of the 679 grubs parasitized, 438 had from 1 to 10 destroyed egg shells on them, amounting to a total of 1,001 eggs. In addition to this, 14 of the 75 nonparasitized grubs and 5 of the 41 nonparasitized prepupae had from 1 to 5 destroyed egg shells on them, or a total of 46. This makes a grand total of 1,047 eggs that had been laid on grubs and destroyed, owing to reparasitization. Although the diggings in this plot show a very favorable rate of parasitization, it is thought that this is too high an average for the remainder of the pasture, as further samplings in the more open parts of the pasture showed a lower percentage. However, as the host development was so far advanced, it was impossible to make a detailed survey of the more open parts of the pasture on the same basis as on the original plot.

JAPANESE BEETLE CONTROL

Reorganization of Dutch elm disease personnel.--By June 30, 2,048 men meeting requirements had been added to the work-relief payroll by referral from the N. R. S. offices. Men accepted for this work and meeting a preliminary adaptability test were started in a brief course of scout training. Most of the men failing to qualify as scouts will be used as laborers on eradication. At the end of the month confirmed Dutch elm disease cases totaled 8,861, with 726 diseased trees still standing. Dead and dying trees tagged totaled 877,453, with 413,404 standing. Total personnel engaged in this work on June 30 numbered 2,506.

Japanese beetle trapping started in Southern States.--Setting of Japanese beetle traps was completed in 33 Virginia communities and 23 South Carolina towns and cities in June. With a few exceptions, all traps to be distributed this season in North Carolina and Maryland were in place. Thirty-eight localities in North Carolina and 23 Maryland communities have been selected for trapping this season. Trap setting in West Virginia was just getting under way. Traps were also in operation in East Saint Louis, Ill., and Detroit, Mich., by the end of the month.

Seasonal quarantine on fruits and vegetables effective June 15.--Organization of personnel and assembly of supplies and equipment for inspection of farm products engaged district supervisors throughout the Japanese beetle regulated area. By the end of the month 79 temporarily employed farm-products inspectors had been added to take care of the requirements of this seasonal quarantine. Special platforms have been erected or rented in Fredericksburg and Exmore, Va., Washington, D. C., Baltimore, Cumberland, and Hagerstown, Md., Wilmington and Wyoming, Del., Philadelphia and Pittsburgh, Pa., Camden, N. J., and Syracuse and Menands, N. Y. The treating division has concluded tests to determine the most effective manner of fumigating refrigerator cars of potatoes and onions, using hydrocyanic acid and releasing the desired quantity of it in the form of a spray.

Nursery and greenhouse scouting started.--Surveys to determine the presence or absence of Japanese beetles in heretofore uninfested classified nurseries and greenhouses were started in Virginia, Maryland, and Delaware. Thirty-five per diem Federal scouts, and 17 State-paid scouts began their activities on June 17. Scouting will be organized in the more northern States to coincide with probable beetle emergence, which still appears to be approximately 2 weeks or 10 days later than in an average year.

Defoliations observed by district inspectors.--A heavy infestation of sawfly larvae has defoliated about half of a 15-acre block of red pine trees in Marlboro, Mass., on the property of the Metropolitan Water Commission. The trees are about 20 feet in height. The district inspector in Rhode Island reports the finding of an infestation of spiny elm caterpillars where a number of willow trees were completely defoliated. Birch and poplar trees were about 15 percent defoliated. Spiny elm caterpillars are reported as feeding on willow trees in the Barre, Vt., district. The district inspector in Essex, Mass, reported an area of about 1 acre in which all elm trees are from 75 to 90 percent defoliated by cankerworms.

Revised Japanese beetle quarantine regulations issued.--Under new regulations effective June 1, 1935, certification is required for fruits and vegetables of all kinds when moved via truck or refrigerator car from the District of Columbia, and those parts of Delaware, Maryland, New Jersey, Pennsylvania, and Virginia known to be continuously, and, at peak emergence of the insect, densely infested with the beetle. As a condition of certification of fruits and vegetables, other than onions and potatoes, moving via refrigerator car from the zone of flight, there are required inspection and loading in a manner to prevent infestation, in a refrigerator car with closed or adequately screened door and hatches, which car prior to loading has been determined by an inspector as thoroughly swept and cleaned by the common carrier in a manner to rid it of infestation. No change in regulated area was involved in this revision of the regulations.

Connecticut joint classified nurseries free from gypsy moth infestation.--During the first half of the month district inspectors in Connecticut scouted for gypsy moth larvae on deciduous stock in nurseries that are jointly classified for shipment under both Japanese beetle and gypsy moth quarantines. The presence of gypsy moth infestation on deciduous nursery growth can be readily detected at this season of the year when the gypsy moth larvae are feeding on the foliage. The surveys were with negative results.

Canadian and Maine corn borer quarantines.--On June 1, 1935, the Canadian quarantine on account of the European corn borer went into effect, and 2 days later the State of Maine quarantine for the same insect was effective. These quarantines regulate the shipment of vegetables, plants, and cut flowers of certain types from the New England States to the Dominion of Canada and the State of Maine. Inspectors in the Boston district have been called upon to make inspection and certification of native beets with tops, greenhouse-grown flowers of gladiolus, and entire plants of chrysanthemum in compliance with these quarantines.

FOREST INSECT INVESTIGATIONS

Aphid injury to ponderosa pine in Prescott Forest.--J. M. Miller, of the Berkeley, Calif., laboratory, reports that during the season of 1934 a stem-infesting form of aphid on the ponderosa pine of the Prescott National Forest was so abundant that forest officers raised the question of injury. In some areas the honeydew drip covered the ground and lower vegetation. The infestation persisted until late in the spring, when it gradually disappeared with the advent of the summer rainy season. Allen S. West was assigned to a study of this problem in May and was located at a Forest Service C. C. C. camp near Prescott, Ariz. The 1935 aphid infestation has been so light that difficulty was encountered in finding material for study.

Severe infestation of a pine tipmoth.--Mr. West reports that during the spring of 1935 there has been a severe attack on ponderosa pine tips by the southwestern species of the pine tipmoth (Rhyacionia neomexicana Dyar). It was found to be doing appreciable injury throughout the ponderosa pine of the Prescott National Forest. Older mature pines, however, suffered but little from this species.

Salvage logging of bark-beetle-infested trees.--Mr. Miller reports that the logging division of the Fruit Growers Supply Company, located at Susanville, Calif., has been carrying on an operation during the spring and summer of 1935 for the purpose of salvaging material from trees recently killed by the western pine beetle and other bark beetle species in the northeastern part of California. Trees selected for cutting are felled in the woods and logged by means of power equipment to the company's mill at Susanville, where the infested bark is destroyed. In order to determine the quantity and quality of merchantable material that can be cut from these beetle-killed trees, the Forest Service instituted a mill-scale study which was carried out at the Susanville mill from June 19 to 22. Logs comprising approximately one-half million board feet were run through the mill and the product tallied according to lumber grades. The Berkeley laboratory cooperated on this study by marking the trees on a sample area selected for the mill-scale study, recording the essential entomological data and marking the logs from each tree so that they could be identified at the mill.

Spray control of lodgepole needleminer undertaken on Yosemite Park.--K. A. Salman and G. S. Hensill, Berkeley, were engaged during July in laying out a program for a large experimental control project for determining the practicability of controlling Recurvaria milleri Busck by means of oil sprays. About 50 acres of infested lodgepole pine stand had been laid out in plots representing varying intensity of needleminer infestation. The National Park Service has established a stump C. C. C. camp in the experimental area to handle the labor of applying the sprays. Since the flight and attack of this species of needleminer occurs but once in 2 years, it is necessary that the experimental work be concentrated within a brief period of 6 weeks during the 1935 season. The next period of attack will not occur until the summer of 1937.

Pupation requirements for western pine beetle.--In May J. M. Whiteside, a graduate student of the University of California, completed a study of the temperature conditions necessary to the pupation of this bark beetle. This was a cooperative project carried on by the Berkeley laboratory and the Entomology Division of the University of California. Mr. Whiteside has tentatively demonstrated that, in the fall of the year, the physiological change from the last active fourth-instar larval stage to the prepupal condition acts as a barrier and prohibits the transformation to the pupal stage at temperatures near the zero of development (about 50° F.). Once the prepupal condition has actually been attained, the metamorphosis to the pupal and thence to the callow adult stage will continue uninterrupted at temperatures as low as 45°. This is 5° below the previously suggested zero of development. Indications are that this phenomenon will take place at temperatures as low as 41°. The fact that a higher temperature is required for pupation than for larval and post-pupation development serves to explain why the pupae of the western pine beetle are rarely found during the winter period. With approach of winter temperatures in the field, pupae found in the fall will transform to adults, which usually emerge. At the same time young larval stages will develop up to mature larvae; however, owing to the lack of temperatures high enough to permit pupation, mature larvae in the same broods will remain dormant until the following spring. The result is that by the end of the winter season the bulk of the broods are in the mature larval stage. Then, with the first warm weather of the spring period, almost all individuals of the broods transform to pupae at about the same time. Pupation is followed by rapid transformation to callow adults, followed in turn by a very heavy peak of emergence. It is obvious that this condition allows for a heavy concentration of new adults after emergence upon living trees during the period of rapid growth which occurs during the spring and early summer.

Survey of insect losses in Idaho and Montana.--J. C. Evenden, of the Coeur d'Alene, Idaho, laboratory, reports that a survey is being conducted to determine the annual loss of timber as a result of insect attack within the forests of Idaho and Montana. This is a part of the national timber survey by the Forest Service. The part of the survey relating to insect losses is under the direct supervision of the Coeur d'Alene laboratory.

Forest tent caterpillar and its parasites.--J. V. Schaffner, Jr., of the Melrose Highlands, Mass., laboratory, reports that severe outbreaks of the forest tent caterpillar (Malacosoma disstria Hbn.) occur in maple-sugar orchards in many localities in Vermont. The maple-sugar producers in that State are alarmed over the situation. Permanent sample plots will be laid out for the study of injury to sugar maple and to determine the effect of defoliation on sap flow and sugar content. The results on the issuance of moths and on the parasitization of cocoons of M. disstria collected in some heavy infestations of this insect are summed up in the following table. The issuance of both moths and parasites is practically complete.

Locality	Cocoons collected	Moth issuance		Parasites		Parasitization
				Hymenoptera	Tachinidae	
	Number	Number	Percent	Number	Number	Percent
Pawlet, Vt----------	176	5	2.8	18	43	34.66
Bennington, Vt------	299	15	5.0	64	62	42.1
Randolph, Vt--------	132	27	20.5	25	43	51.5
West Rutland, Vt---	95	16	16.8	9	19	29.5

It will be noted from the above table that moth issuance was low. Disease undoubtedly caused considerable mortality. No records of parasite issuance from larvae and freshly formed pupae were obtained but it is safe to say that such parasites as Compsilura concinnata Meig. killed a certain percentage of the host. The records obtained indicate, however, the importance of insect parasites in the control of this forest defoliator.

Relation of gypsy moth abundance to forest composition.--W. L. Baker, Melrose Highlands, reports the results of a gypsy moth-forest type survey conducted in the town of Petersham, Mass., during the period of maximum defoliation by the insect in 1935. On analysis, the data showed a remarkable correlation between the proportion of favored trees in the stand and the degree of defoliation. In 70 percent of the stands four species of trees--gray birch, poplar, red oak, and white oak--either singly or in combination, constituted from 75 to 100 percent of the composition and in 95 percent of the cases they constituted over 50 percent. The remaining 5 percent of the defoliated areas were in alder swamps, alder being a very favored food plant. In not a single instance did food plants known to be unfavored constitute as much as 50 percent of the composition.

Increased solubility of spray materials due to leaf activity.--S. F. Potts, Melrose Highlands, reports: "Some experiments were conducted on certain phases of the foliage-injury problem which needed further corroboration before the data are published. The results show: (1) That plant juices and dissolved solids diffuse into dew, fog, and rain water deposited on the leaves; that a continuous supply of plant acid sets up a buffered condition; and that this buffer action is the chief cause of the breaking down of arsenicals and bordeaux mixture on the plant. The solubility of lead arsenate was about 20 times as great on the plant as in distilled water. (2) That 'dirt' and CO_2 (from the air and from leaf respiration) are dissolved into the dew from the leaf surface, but these are not the chief factors concerned in the breaking down of most spray residues, although CO_2 is an important factor in the decomposition of calcium arsenate. (3) When a solution of copper or arsenic was in contact with one surface of the leaf, and distilled water in contact with the other surface, approximately 5 percent of the arsenic or copper was recovered in the distilled water in 24 hours, having passed through both leaf membranes. The diffusion was more rapid through the lower surface than through the upper surface."

Lead arsenate spray on wet foliage.--Mr. Potts also reports: "Preliminary inspection of the data on the deposit and adherence in plots sprayed with hand and power machines using lead arsenate and fish oil when the leaves were wet, indicates that it is practical to spray when the foliage is wet, provided a heavy rain does not occur immediately after treatment (before the foliage dries). In dry plots excess spray *decreases* the deposit; in wet foliage plots excess spray *increases* deposit by replacing leaf water with spray."

Parasites of pine shoot moth.--P. B. Dowden and P. A. Berry, Melrose Highlands, report as follows on the pine shoot moth parasite material received this year and the number of parasites liberated: "Nine shipments of pine shoot moth parasite material have been received from W. F. Sellers, Oberpullendorf, Austria, this season. Emergence of parasites has been disappointing, owing to very heavy secondary parasitization. The species received were as follows: *Lypha dubia* Fall., *Actia nudibasis* Stein., *Copidosoma geniculatum* (Dalm.) Mayr, *Orgilus obscurator* Nees, *Cremastus interruptor* Grav., *Pimpla* sp., *Ephialtes examinator* Fab., and *Tetrastichus turionum* Hartig. Several colonies of parasites have been liberated from the Melrose Highlands laboratory, and the Dominion of Canada parasite laboratory at Belleville, Ontario, has cooperated by sending several shipments of parasites for liberation at Niagara Falls, N. Y. Liberations from the Melrose Highlands laboratory have been completed, but further liberations will be made at Niagara Falls. Liberations of Canadian material at Niagara Falls were made by P. A. Berry, Melrose Highlands, and W. E. Smith, of the New York State Department of Conservation. Mr. Berry left Melrose on July 21 returning July 31."

Parasites of Rhyacionia.--Liberations of *Tetrastichus turionum* consisted of adults that issued from material received from Austria in 1934. Mr. Berry has done some experimenting with methods of rearing the species and has found that by isolating fresh host pupae, and wrapping them in cotton, good results can be obtained. This work is slow, but large-scale rearing of the parasite could be accomplished if large collections of host material were made early in the season.

Parasite of willow-leaf beetle.--Mr. Dowden reports as follows on *Schizonotus sieboldi* Ratz., a pupal parasite of *Plagiodera versicolora* Laich: "Weekly collections of 100 fresh pupae have been made at Belmont, Milton, and Saugus, Mass. Laboratory rearing indicates that the parasite may pass through three distinct broods in a season, but that each brood overlaps the others. For instance, about 15 days are required for the parasite to develop from egg to adult, but adults of the first brood may lay eggs over at least 26 days. A reproductive capacity experiment using 15 females has been conducted with good results. One female (still ovipositing) has laid 283 eggs."

Dutch elm disease vectors.--W. D. Buchanan, of the Morristown, N. J., laboratory, reports that in his experiments with *Saperda tridentata* Oliv. as a vector of the Dutch elm disease, the fungus was obtained from 2 of 63 adults which, after they emerged from disease-free logs, were allowed to feed on a diseased tree, then on a disease-free tree before being referred to the Bureau of Plant Industry for culturing. C. H. Hoffman, of the same laboratory, has been studying the biology of this common elm borer and states that the female usually chews out a hole in the bark for the reception of the ovipositor, after which she reverses her body and deposits an egg in the puncture. Eggs may be thus inserted between the outer and inner bark or deep in the inner bark. Sometimes, however, the egg is tucked directly beneath flakes of the outer bark. In articles published on the species it has usually been stated that the eggs are laid on the bark.

PLANT DISEASE CONTROL

Scouting for white pine blister rust in California.--On July 9 five regular members of the California blister rust staff established a camp near Mt. Shasta, in northern California, for the purpose of systematically examining Ribes bushes and sugar pines to determine whether there are blister rust infections in that vicinity. The nearest known pine infected with blister rust lies about 150 miles to the north and the closest pinyon pines are located about an equal distance to the southeast. Both white and sugar pine trees occur in the immediate vicinity of the 1934 infections.

Blister rust control on the Allegheny National Forest.--Blister rust control has been established and is being maintained on the Allegheny National Forest in all areas containing white pine of sufficient value to justify protection measures. During May and June 1935 necessary control work was performed by 40 men from two C. C. C. camps, a total of 234,427 currant and gooseberry bushes being eradicated from 1,431 acres. The application of control measures on this forest since 1929 has resulted in protecting the white pines from blister rust infection. This satisfactory condition contrasts sharply with the rapid increase of pine infection in many unprotected areas in Pennsylvania.

Emergency work begins on blister rust control project.--Blister rust control work under the Emergency Relief Program is now getting under way, 454 persons having begun work on this project up to July 31. Of these, 413 were from relief rolls and 41 were nonrelief workers.

Losses from black stem rust.--Losses from black stem rust occurring this season in the spring wheat belt are largely limited in geographical extent, being most severe in western Minnesota and in the eastern parts of North Dakota and South Dakota. These losses are following similar damage to the winter wheat crop of eastern Kansas and eastern Nebraska. A considerable percentage of the injury attributed to stem rust this spring has been due to dry, hot weather the last of July. Shriveling of the kernels was noted on experimental rust control plots, as well as on rusted grain, although of course to a less extent.

Progress in barberry eradication.--In Michigan more than 36,000 barberry bushes were eradicated on 483 properties during the period from March 25 to July 31, according to F. B. Powers, in charge of barberry eradication in Michigan. Over 6,000 bushes were eradicated on 171 properties in three counties during that period. Fifty-nine of the total number of properties cleared were reported by school children and members of children's organizations, as a result of informational work conducted last winter.

Barberry eradication work in Illinois.--The P. W. A. program in barberry eradication conducted in Illinois during the period August 23, 1933, to June 30, 1935, resulted in a survey of 5,988 square miles. More than 40,000 barberry bushes were destroyed. The Works Progress Administration in barberry eradication was begun in Illinois the first week in August in six counties.

General statement on barberry eradication.--On August 13, 790 persons from relief rolls and 103 nonrelief workers had been given employment throughout the barberry-eradication area. W. P. A. work is getting under way in Pennsylvania, Virginia, and West Virginia. Some seasonal eradication was carried on in Virginia last year, but this year's work is the first in Pennsylvania and West Virginia. State leaders have recently been assigned and organization is getting under way.

COTTON INSECT INVESTIGATIONS

Thurberia eradication with reference to Thurberia weevil infestation in domestic cotton.--T. P. Cassidy, Tucson, Ariz., reports that at Fresnal, Ariz., cotton has been planted in an isolated area in proximity to Thurberia plants for several years and the maximum boll infestation by Thurberia weevils each year from 1930 to 1934 was 33.8, 31.0, 44.0, 39.8, and 17.7 percent. Beginning in June 1935, all Thurberia plants growing within a mile of this cotton are being destroyed to determine the effect this will have in reducing the weevil infestation in the cotton next year.

Notes on the cotton flea hopper.--K. P. Ewing and R. L. McGarr, Presidio, Tex., report: "From approximately the same numbers of plants installed each year, the emergence of cotton flea hoppers between February 1 and June 30 was 96,192 in 1933, 44,110 in 1934, and 46,689 in 1935. The percentage of hoppers emerging from croton in 1933 was 98.9 percent; in 1934, 99.6 percent; and in 1935, 99.8 percent. On 12 standard flight screens, 5,321 hoppers were collected in April, May, June, and July 1935, as compared to 10,967 in 1934 and 12,501 in 1933. This season's collections from the different sides of the screens to August 1 were: West, 1,934; east, 1,730; south, 950; north, 707. The prevailing wind direction was southeast. This indicates that the migration of the flea hoppers collected on the screens did not follow the prevailing wind direction. The wind did not blow from the west for a single hour during May and June. Two sets of screens have been used this season to obtain information as to the relative abundance of flea hoppers at different altitudes. Two standard-size screens, 3 by 5 feet, are exposed at each elevation. Before August 1 a total of 1,201 flea hoppers were collected at the four elevations as follows: 3 to 6 ft., 416; 9 to 12 ft., 216; 15 to 18 ft., 201; 21 to 24 ft., 323. It is of interest to note the large number of hoppers collected at the highest elevation. * * * Picking has been started but is not completed on the experimental plats and field experiments on dusting for flea hopper control. In one series the first picking yielded 62 pounds of seed cotton on the check plat and 834 pounds on the plat dusted with sulphur and 10 percent paris green. In the first picking of one of the field tests, 82 pounds of seed cotton per acre were picked from a 7-acre check field and 213 pounds per acre from 40 acres dusted with sulphur."

Microbracon kirkpatricki Wilk. in relation to the boll weevil.--A shipment of M. kirkpatricki, one of the pink bollworm parasites recently brought from Egypt to the Presidio laboratory, was received at Tallulah, La., on July 15. Although the species had probably never before come in contact with the boll weevil, it readily attacked it. In fact, in the brief studies made in the insectary this African species of Microbracon seemed to attack the weevil more readily than did M. mellitor Say, the most important native parasite of the boll weevil in this country. Although somewhat smaller than M. mellitor, M. kirkpatricki finds the weevil larvae just as easily, even in squares as long as 5/8 inch. M. kirkpatricki, unlike M. mellitor, often lays more than 1 egg on its host. In one instance in which 6 eggs were laid on the same weevil larva, all hatched and 5 of the developing larvae spun cocoons after destroying the weevil larva and the sixth parasitic larva as well, and 3 adult males developed. From the 47 adult parasites (31 males and 16 females) that were reared from the egg stage before August 2, data were obtained for the following comparisons:

Period	M. mellitor	M. kirkpatricki
Average oviposition	10 minutes (3-90)	3-5 minutes
Egg	21-23 hours	18-20 hours
Larval feeding	3 days	3 days
Cocoon	9 days	5 days
Cycle, oviposition to emergence	12-15 days	9 days

With its shorter life cycle, M. kirkpatricki would have, theoretically, more generations per year than M. mellitor.

Cotton bollworm serious in Texas.--R. W. Moreland, College Station, Tex., reports that examinations of 2,700 plants during the week ended August 10 showed an average of 105 eggs per 100 terminal buds, as compared to 25 the previous week and 1 egg per 100 buds during the same period in 1934. Examination of 3,274 forms in the check plats showed that 35.4 percent were injured, whereas 19.4 percent of the 2,054 forms examined in the plats dusted with calcium arsenate were injured. Severe damage by the bollworm has also been reported from other sections of Texas.

Cotton leaf worm control.--K. P. Ewing, Port Lavaca, Tex., reports that he has never before observed such a prolonged fight against the cotton leaf worm as has been waged in Calhoun County, Tex., this year. Every acre of cotton in the county has been poisoned from three to six times for leaf worm control. Lead arsenate as a spray has been most generally used; calcium arsenate as a dust comes next; and straight paris green is third. The proportion of acres dusted with the latter has been very small. Excellent results have been obtained. The control of leaf worms at the time of reporting (August 10) had been approximately 100 percent.

Lead arsenate vs. calcium arsenate in relation to cotton aphid.--Mr. Ewing also reports on August 10 that the cotton aphid is noticeably on the increase, especially in fields dusted with calcium arsenate. The loss in one field of 175 acres is already considerable. Nearly all the leaves have fallen from the cotton plants and many small bolls of the top crop are now falling. This field was dusted four times with calcium arsenate. A nearby field sprayed with lead arsenate shows no appreciable aphid infestation.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Trap-plot cotton in the Big Bend area of Texas.--The trap-plot cotton in the Big Bend area of Texas was continued during July. By the first of August the field cotton in the Presidio section was so far advanced and contained such a large number of mature green bolls, that it was not considered practical to continue the trap plots in that section; besides very few worms were being caught. In the Castolon section the plots will be continued for some time yet. For the season 221,105 blooms were inspected in the Presidio section, from which 7,574 worms were taken, whereas last season 245,267 blooms were inspected and 5,995 worms collected. Last year these plots contained approximately 400 plants each, but this year the plots are about 1/4 acre in size. The additional worms collected this season may be due to a slight increase of the infestation, or it is possible that the larger traps used this season were more attractive to moths. In the Castolon section 327,985 blooms have been inspected this season and 14,077 worms collected, as compared with 519,610 blooms and 3,481 worms last season. The plots at Castolon were the same size as last year, consequently the increase in worms is attributed to seasonal fluctuation. It is of interest to note that from the 99,635 blooms collected in the fields adjacent to the Castolon plots, only 357 worms have been collected. This indicates that the plot cotton is still much more attractive to moths.

Pink bollworm control in Florida.--During July the wild cotton was removed from the area along the west coast that had not previously been recleaned for a second time this season. Most of the seedling plants were exceptionally small, but along the upper part of the west coast, which was gone over last November and December, some fruit was found to have matured. Only a few bolls had opened, and indications were that none had fallen to the ground. Boca Grande Island, about 15 miles west of Key West, was also recleaned. This island was originally cleaned in May 1934, and by the time it was recleaned during the following winter practically every seedling plant had matured fruit, some of which had been shed. The work done in August covered 244 acres, from which 80 mature, 94,158 seedling, and 59 sprout plants were removed. All of the mature plants came from a new colony located in Charlotte County.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Insecticide tests against the pea aphid.--J. E. Dudley, Jr., Madison, Wis., reports that best results were obtained with a spray containing derris root powder in water, plus a commercial preparation of sulphated phenyl phenol (1-600) which functioned as a spreader and sticker. The rotenone content in the tested spray suspensions ranged from approximately 0.0044 to 0.0133 percent. Fairly satisfactory results were obtained with spray mixture consisting of nicotine sulphate (1-800) containing 40 percent nicotine, and potassium oleate soap (1-90), as well as with a dust mixture containing nicotine sulphate, magnesium carbonate, and hydrated lime. With the spray containing ground derris root and sulphated phenyl phenol, a maximum of 96 percent of the aphids were killed and the yield of shelled peas from the treated plots ranged from approximately 2 to 3 times greater than in the comparable untreated plots, as the result of one application of the spray.

Evidence that sweetpotato weevil adults can fly.--K. L. Cockerham and O. T. Deen, of the Biloxi, Miss., laboratory, report that three adults of the sweetpotato weevil were caught at light traps operated in the Biloxi district during 3 weeks in June. One specimen was caught at a distance of 172½ feet from the nearest infested field. These records constitute the first definite evidence that sweetpotato weevils are able to fly distances that may have a significant effect on their dispersion.

Effect of temperature and wind velocity on flight of beet leafhopper.--In analyzing the results of detailed flight studies of the beet leafhopper in the Coalinga district of the San Joaquin Valley, Calif., late in April and early in May, J. C. Chamberlin and F. R. Lawson, of the Modesto, Calif., laboratory, report (1) that flight activity of beet leafhopper adults begins as early in the morning as the temperature attains a level of 65 to 67° F., continues all day, reaching maximum activity about sunset, and ceases when the temperature falls below 65 to 67°; (2) that flight of the leafhoppers is greatest on days when the maximum temperature exceeds 80° and does not fall below 65° until after 6 p.m., provided the minimum relative humidity is less than 10 percent; (3) that when conditions are favorable, flight will occur regardless of wind direction or velocity, up to 15-20 miles per hour; and (4) that, with the exception of winds of very low velocity, the flight is in the direction of the prevailing wind.

Devil's shoestrings root compared with derris for control of imported cabbage worm.--C. B. Wisecup and J. P. Vinzant, of the Sanford, Fla., laboratory, report that in a recent series of laboratory tests with a precision duster, undiluted and finely ground root of devil's shoestrings (*Cracca virginiana* L.) proved as toxic as derris dusts of ordinary commercial strengths to quarter-grown and half-grown larvae of the imported cabbage worm. Against the quarter-grown larvae, the samples of *Cracca* containing approximately from 0.05 to 0.1 percent rotenone were as effective as a derris dust containing 0.5 percent rotenone and were more effective than a derris dust containing 0.1 percent rotenone. Against half-grown larvae the samples of *Cracca* containing from 0.05 to 0.1 percent rotenone were definitely inferior to a derris dust containing 0.5 percent rotenone. When directed against the half-grown larvae, undiluted samples of *Cracca* having rotenone contents ranging from 0.17 to 0.42 percent gave percentages of kill equally as high as those from derris dust containing 0.5 percent rotenone. In a special series of tests with a sample of *Cracca* that did not contain any detectable trace of rotenone but which did contain 8.1 percent total extractives, the percentage of kill against half-grown and quarter-grown larvae of *A. rapae* was approximately equal to that obtained with the finely ground clay commonly used for diluting dust mixtures, indicating that the presence of rotenone in *Cracca* is essential in order to obtain effective insecticidal action.

Control of Gulf wireworm by crop rotation.--K. L. Cockerham and O. T. Deen, of the Biloxi, Miss., laboratory, found that in field studies conducted on the Gulf wireworm (Heteroderes laurentii Guer.) in Alabama and Mississippi, during the spring of 1935, this pest was most numerous and caused most damage in fields where potatoes were grown for a succession of years than in fields where acceptable crop rotations were practiced. The wireworm population was lowest and the damage least to potato tubers where this crop followed the breaking up of sod land.

Sulphur as a deterrent in preventing oviposition by sugar beet wireworm.--R. S. Lehman, of the Walla Walla, Wash., laboratory, reports that sulphur has appreciable merit as a deterrent to oviposition by the sugar beet wireworm (Limonius californicus Mann.). When sulphur was applied to the soil surface of a series of plots at the rates of 100, 150, 200, 300, and 400 pounds per acre, respectively, the number of eggs deposited by the adults of L. californicus was materially reduced on the treated plots, as compared to adjacent and similar untreated plots.

Spring host plants of beet leafhopper in California.--F. R. Lawson and H. E. Wallace, of the Modesto, Calif., laboratory, report that host-plant studies conducted in the foothills of the San Joaquin Valley of California, from Tracy to Coalinga, revealed that the desert plantain (Plantago erecta Morris) was the most important spring host plant of the beet leafhopper in this district during the spring of 1935. These studies also revealed that eggs were deposited in nearly all of the susceptible species of host plants present on breeding areas where the growth conditions were favorable, and that nymphs emerged therefrom. It appeared from these studies that the relative degree of susceptibility of the several species of plants under observation varies from year to year in accordance with the physiological condition of the plants during the period of egg deposition and that favorable growth conditions for the host plant were of primary importance, the selection of a particular plant species for egg deposition being a secondary consideration. Also, it was shown that the degree of virulence of the curly-top virus carried by the leafhoppers varied more with the species of host plants involved than with the proximity of these plants to beet fields.

INSECTS AFFECTING MAN AND ANIMALS

The screw worm situation in Texas and the Southeast.--Screw worms continue to cause considerable losses in range animals in the Edwards Plateau and other livestock-raising areas of southwestern Texas. Ranchmen in Menard, Schleicher, Concho, McCulloch, Kerr, and Kimble Counties report from 10 to 30 percent of their animals infested. In the Big Bend area the recent rains, which have placed the ranges in better condition than they have been in the past 5 years, have also produced favorable conditions for the breeding of screw worm flies; consequently there is a rather severe and unusual outbreak of this pest. In the seven Southeastern States, including a portion of southeastern Texas, where the Bureau is undertaking an extensive control campaign, screw worm flies have shown increased activity, except in Mississippi and Florida. Numerous local showers have maintained ideal conditions for fly breeding and this is probably the factor responsible for the increase in numbers of infestations. The conditions thus far are by no means serious, but additional supplies of benzol and pine tar oil are being rushed to these States to take care of any emergency that may arise. Approximately 25,000 gallons of each of these medicines has already been distributed to the States concerned. In Georgia 425 pens and chutes for handling infested livestock have been constructed.

Mosquito outbreak follows floods in New York.--The recent floods occurring in southern and central New York have brought about ideal conditions for the production of enormous numbers of the floodwater mosquitoes (*Aedes hirsuteron* Theo.) and the common swamp species (*Aedes vexans* Meig.). Flooded cellars, catch basins, and numerous small stagnant pools have contributed to increasing the numbers of house mosquitoes.

Effect of carcass burning for control of primary screw worm fly.--Recent investigations conducted by E. W. Laake and E. F. Knipling, Valdosta, Ga., on the effect of carcass burning to destroy larvae of *Cochliomyia americana* Cushing and Patton, indicate that most of the larvae of this species infesting an animal at the time of its death will migrate from the carcass within 48 hours after the animal dies. In view of these findings, it appears necessary that, in order to destroy the maggots, the carcass should be burned within 2 days after the animal dies.

Flight range of two species of mosquitoes.--H. H. Stage, of the Portland, Oreg., laboratory, reports that on June 24 at Lotus Island a large number of freshly emerged mosquitoes of *Aedes aldrichi* Dyar and Knab and *Aedes vexans* Meig. were sprayed with a 1.5 percent solution of methylene blue for the purpose of determining their longevity and flight range. Up to July 31, 4,705 adults have been captured and examined for stain and positive traces were found on adults taken from 5 widely scattered localities. Dispersion took place in all directions but the most distant point at which stained adults were taken was 5 miles from the point of origin.

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Living and dead larvae of the Mediterranean fruit fly (*Ceratitis capitata* Wied.) were intercepted at Boston on May 27 in a lot of 800 oranges in ship's stores from Spain. Of 24 oranges, larvae were found in 10. Living larvae of *Baris laticollis* Mrsh. were taken at New York on May 9 and at Philadelphia on May 4 in turnip roots in ships' stores from Algeria. This weevil has arrived previously in turnips from England, France, and Portugal, and in rutabaga (*Brassica campestris*) from France. Living adults of *Euspermophagus gossypii* (Chev.) were found at Washington, D. C., on September 25, 1924, with seeds of *Ipomoea albivenia* in the mail from Mozambique, Africa. J. C. Bridwell states that these morning-glory seeds have often been mistaken for cotton seeds, even by the describer of this bruchid. An adult of *Faula pilatei* Har. arrived at Mobile, Ala., on April 18 on banana debris in cargo from Guatemala. A living adult of the Tahitian coconut weevil (*Diocalandra taitensis* Guer.) was taken at Honolulu, T. H., on March 18 on a coconut in baggage from American Samoa. A living adult of *Xyleborus torquatus* Eichh. was intercepted at Nogales, Ariz., on April 28 in a tomato fruit in cargo from Culiacan, Sinaloa, Mexico. It was feeding in its own tunnel in the core at the center of the fruit. Living specimens of the gladiolus thrips (*Taeniothrips gladioli* M. & S.) arrived at San Francisco on May 4 on gladiolus flowers in baggage from Hawaii. Five living adults of *Myelois decolor* Zell. were taken at New York on May 8 with algarroba(*Hymenaea courbaril*) pods in baggage from Jamaica. *Taeniothrips picipes* (Zett.) was intercepted at Philadelphia on September 20, 1934, on heather in the mail from Scotland. This European thrips feeds on a large number of plants. A living specimen of *Ischnodemus sallei* Sign. arrived at Galveston, Tex., on May 20 on banana debris in cargo from Honduras. Living larvae and dead adults of the pink bollworm (*Pectinophora gossypiella* Saund.) were intercepted at New Orleans on May 21 in cottonseed in baggage from Brazil. A larva of the Asiatic rice borer (*Chilo simplex* Butler) was taken at New York on May 16 in a rice-straw mat in baggage from Syria. This represents the first record in our files of this pyralid being intercepted from Syria.

FOREIGN PLANT QUARANTINES

Pathological interceptions of interest.--*Cercospora xanthoxyli* Cke. was intercepted on *Zanthoxylum* sp. from Cuba, first interception, on July 5 at Philadelphia; *Colletotrichum gloeosporioides* Penz. (?) with setae of *C. nigrum* E. & H. but spores more like those of *C. gloeosporioides* Penz. or *Gloeosporium piperatum* E. & E. was intercepted on June 17 at New Orleans in peppers from Panama; *Colletotrichum graminicolum* (Ces.) Wils., first interception from Italy, was made on July 11 on wheat at New York; the first interception of *Graphiola borassi* (Syd.) Butl. was made on July 15 at Philadelphia on *Borassus* sp. from India; *Peronospora parasitica* (Pers.) D. By., first interception from Japan, was made at Baltimore on July 23 on cabbage; *Phyllachora* sp. was intercepted at New York during May, June, and July on *Axonopus* sp., *Paspalum* sp., and *Panicum* sp. from Brazil, on *Distichlis spicata* and *Bromus catharticus* from Argentina, and on *Paspalum* sp. from Mexico; *Phyllachora trifolii* (Pers.) Fckl., first interception from Ireland, was made at New York on March 13 on shamrock; *Pseudopeziza medicaginis* (Lib.) Sacc. was intercepted at New York on March 13 on shamrock from Ireland and at El Paso on July 17 on alfalfa from Mexico, first interceptions from these countries; *Puccinia* sp. intercepted on *Andropogon* sp. (?) from Mexico on July 1 at Seattle does not check with any described species; *Vermicularia* sp., first interception of genus on *Eragrostis* sp. from Mexico, was taken at New York on June 20.

Shoes cover more than feet.--"Heavy shoes only", said the passenger from Puerto Rico in presenting a carefully wrapped box to the New York inspector. Each of four shoes carefully wrapped in tissue was found to contain 3 mangoes, and a box of "dulce" contained 13 more.

A new-style nosegay.--A nosegay in the lapel of a coat carried on the arm of a woman returning from England attracted the attention of one of the New York plant quarantine inspectors. Upon investigation, it was discovered that two plants in soil were concealed in the sleeves of the coat. One of the plants, a Pittosporum, was found to be infested with larvae of a tortricid and of Myzus veronicae Del G. It is of interest to note that the last-named insect was parasitized by a species of Aphidius.

DOMESTIC PLANT QUARANTINES

Phony peach disease in Maryland and Kentucky.--The first definite cases of the phony peach disease in the above States came to light in the recent survey of peach-growing areas in these States. In Maryland 2 infected trees were discovered in Washington County, and in Kentucky 2 were found in Henderson County and 1 in Webster County. This work is part of a general cooperative survey of States bordering on the north of the known infected area, for the purpose of finding and eradicating any such infections.

Growers provide more labor in phony peach orchards.--More labor in the cutting of limbs and digging out of trees infected with the phony peach disease has been furnished by peach growers in Georgia this summer than in previous seasons. Inspectors had been making a practice of sawing off limbs as infections were found, but experiments proved that in the aggregate this work retarded inspection and diagnosis. Growers were informed of the situation and nearly all responded willingly to the new requirement of removing their own infected trees. More calls for inspection were received than the force was able to meet.

Citrus canker discovered in Harris County, Tex.--Federal and State inspectors working cooperatively recently found citrus canker in the southern part of Harris County, Tex., bordering on the Galveston area, where the disease has been reported on several properties. Citrus trifoliata is scattered throughout the Harris County area in hedges or abandoned nursery stock, and it was on a hedge that the disease was found. Owners in this area are readily consenting to the destruction of such trees. Harris County is one of the 21 counties in Texas once known to be infected with the disease.

No citrus canker in lower Rio Grande Valley.--Continued inspection in the commercial citrus-growing area of the lower Rio Grande Valley has failed to disclose any citrus canker in this area.

Japanese beetles found in produce cars in Chicago.--On the recent finding of one live Japanese beetle in a car of produce arriving at Chicago from the infected area, inspectors of the transit inspection and Japanese beetle projects set up special tours of inspection of such shipments and during July a total of 7 beetles were found in 6 cars. Transportation agencies were required to clean the cars thoroughly and burn the refuse. During the month 111 cars were inspected.

Blueberries in air mail from Japanese beetle area.--A California State inspector recently reported a quart of fresh blueberries arriving by plane at Pasadena from Litchfield, Conn., without Japanese beetle inspection. The fruit was destroyed on order of the postmaster.

Transit inspection established at Cincinnati.--Owing to the heavy movement of plants and plant products from the Northeastern States through Cincinnati to points in important agricultural regions, a transit inspector is being stationed on a permanent basis in that city for the enforcement of Federal domestic quarantines. A new railway terminal was recently erected.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Second rearing record for species of Cuterebra.--Specimens reared on July 16, 1934, from a white-footed mouse, received from W. M. Bowdish, Demarest, N. J., through J. E. Shillinger, of the Biological Survey, have been placed by C. T. Greene as *Cuterebra fontinella* Clark. This is the second known authentic report of this insect from that host.

European cruciferous pest tentatively recognized in quarantine material.--The European species *Ceutorhynchus contractus* Marsh has been several times reported as injurious, in the larval stages, through mining in leaves of cauliflower, radish, and *Brassica arvensis*, and is said to occur throughout Europe. Larval specimens from France, found in radish leaves (in ship's stores) by port inspectors at New York City, have been placed tentatively by A. G. Boving as *C. contractus*.

Japanese flea beetle recognized.--One specimen of a flea beetle, found in rice straw from Japan at Seattle, Wash., by a port inspector, has been placed by H. S. Barber as the species *Mantura clavareaui* Hktgr. This insect previously has not been represented in the Washington reference collections.

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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR AUGUST 1935

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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE OCCUPIES NEW LABORATORY AT BELTSVILLE, MD.

The moving of laboratories into the new quarters at Beltsville Research Center has been completed. Most of the investigations now are being continued, after the interruption necessitated by the moving. The new buildings at Beltsville provide much more satisfactory quarters for work than were previously available. The activities centered there are work on bee culture, previously conducted at Somerset, Md.; investigations on the physiology and toxicology of insects; on insects affecting apple, households, stored products, and poultry, previously conducted at Takoma Park, Md.; and on greenhouse insects, formerly headquartered in buildings on the Department grounds near Constitution Avenue and 12th Street. Certain activities on insecticides are also being carried on at Beltsville.

In addition to the laboratory building, suitable laboratory and office space is provided in the headhouses of the four large greenhouses, which are semifire-proof structures of brick and concrete. An up-to-date mushroom house has been built, where the work in connection with insect pests of mushrooms will be centered.

The work carried on at Beltsville is under the direction of six research divisions of the Bureau. To coordinate the fiscal and administrative activities, a committee has been designated to handle matters of common business operations. The committee consists of J. I. Hambleton, Chairman; E. H. Siegler; and F. L. Campbell.

FRUIT INSECT INVESTIGATIONS

Damage to drying apricots by flies.--Perez Simmons, Fresno, Calif., reports that during the summer H. C. Donohoe investigated damage being done by flies, chiefly *Lucilia sericata* Meig., to freshly cut and drying apricots in the Sacramento Valley. The flies were swarming on the cutters and on the cut fruit, which was polluted with fly specks. Drying yards in the vicinity of cow barns and horse stables were most heavily infested. A test was made of shade-cloth protection over six trays of apricots, with controls from the same lot. Both protected and control fruit were exposed to flies before sulphuring, the comparison being made after sulphuring while the fruit was drying in the sun. The cloth was stretched over the trays and was slightly above the fruit by the low side and end cleats of the trays. The apricots were sampled on June 21 after 3 days' exposure, and on June 23 the samples were examined for fly specking. The results are given in the following table.

Extent of injury	Sample Covered (158 pieces)	 Exposed (296 pieces)
	Percent	Percent
None	76.0	6.8
Slight (less than 5 specks per piece)	21.5	40.2
Moderate (5 to 14 specks per piece)	2.5	40.2
Heavy (15 or more specks per piece)	0.0	12.8
Total fly-specked pieces	24.0	93.2

In addition to protecting the fruit during drying, it is evident that the shade cloths should also prevent the flies from feeding on the freshly cut fruit prior to sulphuring.

MEXICAN FRUIT FLY CONTROL

Only one Mexican fruit fly trapped.--Only one adult *Anastrepha ludens* Loew was trapped in Texas in August, this being taken in Laredo, Webb County, on August 2. No *A. ludens* has been trapped in the lower Rio Grande Valley since early in May. Insects generally, and other Trypetidae in particular, have been unusually scarce throughout the month. For the same month last year many more *A. serpentina* Wied. and *A. fraterculus* auct. were taken, as well as other Diptera.

DATE SCALE CONTROL

No date scale found.--Inspection was continued in the Indio, Calif., district during the month of August. A total of 8,527 palms were inspected and no scale was found. In the Imperial Valley 1,625 palms were inspected in the area surrounding the most recent infestation and no scale was found. No scale has been found in the Imperial Valley during the past 18 months.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Pentatomids feed on alfalfa seeds within developing pods.--O. L. Barnes, Tempe, Ariz., found pentatomids feeding on and destroying many alfalfa seeds. In test cages the number of seeds destroyed daily per individual was surprisingly large and shows the damage that may be expected from these insects. He reports as follows: "Four species of pentatomids have been observed feeding at immature seed pods of alfalfa in the field in Arizona. Adults of these species were confined in lantern-globe cages and supplied with branches of alfalfa bearing immature pods. The alfalfa stems were inserted in a bottle of water to prevent rapid drying of the food. The cages were kept in an insectary room with two screened and two partially walled sides. The tests were made between July 1 and August 10. The range of the standard shade temperatures at Tempe, when the different experiments were carried out, was: Maximum, 98° to 108° F.; minimum, 68° to 77°; average daily mean, 86° to 91°. The number of 'insect days' per test ranged from 9 to 20. The species and the respective average number of alfalfa seeds punctured per day per bug were as follows: *Chlorochroa sayi* Stal., 32.5; *C. ligata* Say, 22.6; *Thyanta custator* Fab., 22.3; *Euschistus impictiventris* Stal., 5. *E. impictiventris* was observed to feed at the stems of the alfalfa more than any other species. Similar feeding tests were made using *C. sayi* nymphs of different instars. The average number of alfalfa seeds punctured per day by nymphs of each instar were as follows: First instar, 0; second instar, 1.7; third instar 7.4; fourth instar, 15; fifth instar, 36.8."

Collyria calcitrator Grav., a valuable wheat-stem sawfly parasite.--C. C. Hill, Carlisle, Pa., reports that *C. calcitrator*, an important parasite of the wheat-stem sawfly, has been introduced into parts of Pennsylvania and Ohio where sawflies have been doing considerable damage. Through the courtesy of the Canadian Department of Agriculture, shipments of 11,700 parasites were obtained and releases were made in Pennsylvania at points near Cabot, Butler, Shelocta, Marion, Center, Williamsport, Carlisle, Roxbury, and Red Lion, and in Ohio at points near North Lima, Elliotsville, and Hubbard. Most of the actual work of releasing was done by E. J. Udine, Carlisle. The Canadian Department of Agriculture had previously introduced this parasite from Europe.

Hairy vetch bruchid in the Carolinas and Maryland.--According to J. S. Pinckney, Carlisle, the egg-laying period of *Bruchus brachialis* Fahr. in the vicinity of Salisbury, N. C., this year covered the period from the first week in May until about June 22. The infestation was heavy and few pods escaped attack. The length of the larval stage is about 2 weeks, not including the 2-day period of the prepupal stage. Larvae entering seed on June 10 were entering the prepupal stage on the 24th. This species has been found working in vetch near Hagerstown, Md., by Messrs. Hill and Udine. Although it was found nearby in Pennsylvania last year and again this year, this is the first record of its occurrence in Maryland.

Extreme southern distribution of certain hessian fly parasites.--Mr. Hill also reports that *Eupelmus allynii* French was recovered from hessian fly puparia near Cowpens and Chapin, S. C.; *Merisus destructor* (Say) near Cowpens; and *Ditropinotus aureoviridis* Cwfd. near Chapin. None of these parasites has heretofore been reported in hessian fly from South Carolina.

Heavy hessian fly infestations follow sawfly damage.--Mr. Udine reports finding heavy hessian fly infestations in regions where sawflies caused the most damage in wheat last year. He attributes this partly to the abundance of volunteer wheat last fall caused by heavy lodging from sawfly damage. The lodged grain afforded a good harbor for overwintering hessian fly, resulting in a heavy emergence last spring.

Rearing and digging of grubs.--T. R. Chamberlin and Lee Seaton, Madison, Wis., report that preliminary digging in seven areas in the Madison and Blue Mounds districts showed grub populations ranging from approximately 27,000 to 1,060,000 per acre. The highest grub populations were not found in the districts where adults were most numerous during the flight period. Based on our present knowledge, the larvae found belonged to the hirticula-rugosa group, the fusca-implicita group, and the tristis group. Larvae of Phyllophaga rugosa Melsh, P. hirticula Knoch, and P. implicita Horn have been reared in the laboratory to second stage, and second- and third-stage larvae of P. tristis Fab. have been taken in the field. Newly issued adults of P. tristis were found in the soil late in August.

Sprayed hay not held responsible for death of cattle.--George I. Reeves, Salt Lake City, Utah, reports that a case of arsenical poisoning of cattle at Grand Junction, Colo., alleged to have been caused by feeding hay that had been sprayed for control of the alfalfa weevil, has been investigated. The attending veterinarian stated that the symptoms of the sick cattle were exactly similar to those described by Wakeland in 1924 in a case which was observed throughout by a trained veterinarian and pronounced due to overfeeding of new hay. The samples of the Grand Junction hay, which were analyzed for G. M. List, of the Colorado Experiment Station, were found to contain only insignificant quantities of arsenic--0.155 grains per pound, as against 0.3 in the case reported by Wakeland.

Redwinged blackbirds feed extensively on grasshoppers in Sacramento Valley.--C. C. Wilson, Sacramento, Calif., reports that the redwinged blackbird (Angelaius tricolor) was observed to feed extensively on grasshoppers during August in the Sacramento Valley. Large numbers of grasshoppers were forced to migrate to narrow strips of alfalfa left uncut in the center of the fields and these strips, in turn, became feeding centers for the redwinged blackbirds. With the aid of Joseph Keyes and J. A. Neff, of the Biological Survey, ten birds were killed on August 30 and the contents of their gullets and gizzards were examined. The results are shown in the following table.

Bird No.	Contents of gullets and gizzards	
	Weed seed [1]	Insects or insect parts
	cc	
1	0.8	4 *Melanoplus marginatus* Scudd., 1 leafhopper
2	0.9	4 *M. marginatus*, 6 pairs grasshopper mandibles, and 1 plant bug
3	0.5	4 *M. marginatus*, 20 pairs grasshopper mandibles
4	1.1	1 *M. marginatus*, 15 pairs grasshopper mandibles
5	1.0	1 *M. marginatus*, 2 pairs grasshopper mandibles, 1 *Stictocephala festina* Say, 1 jassid, 1 full-grown larva of *Prodenia praefica* Grote, 1 quarter-grown larva of *Eurymus eurytheme* Bdv.
6	0.2	2 *M. marginatus*, 15 pairs of grasshopper mandibles, and 5 jassids
7	1.3	14 pairs of grasshopper mandibles
8	1.4	4 *M. marginatus*, 14 pairs of grasshopper mandibles, and 1 flea beetle
9	0.5	6 *M. marginatus*, 7 pairs of grasshopper mandibles, and 1 half-grown larva of *P. praefica*
10	0.5	7 *M. marginatus*, 16 pairs of grasshopper mandibles

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[1] Weed seed consisted largely of water grass, with some dock and wild oats.

The examinations showed that a large part of the food eaten by the blackbirds at this time consisted of insects. The practical value of leaving the narrow strips of alfalfa as traps and feeding units in the infested fields was demonstrated by the complete destruction of the grasshoppers by the birds. The death of female grasshoppers in the strips observed at this time should decrease the 1936 population in this field from 15 to 30 percent, considering each female as the potential depositor of at least two egg pods.

JAPANESE AND ASIATIC BEETLE INVESTIGATIONS

Sugarcane a possible host plant of Japanese beetle.--Through the courtesy of the Division of Cereal and Forage Insect Investigations, a number of sugarcane cuttings were obtained from Louisiana in April 1935. T. N. Dobbins, Moorestown, N. J., reporting on the investigations to determine whether or not sugarcane may become a host plant of this beetle, found that Japanese beetle grubs will feed on the roots of sugarcane. Thirty-six cuttings were potted in 10-inch pots and on May 1 the sprouted plants were infested with healthy third-instar larvae. Twelve pots were infested with 25 larvae per pot; 12 with 15 grubs per pot; and 12 were left without grubs, as checks. By May 15 the effect of larval feeding was noticeable. Considerable stunting of the plants and tip-burn occurred on the more heavily infested plants. On July 1, 3 plants in each group were examined and the roots of the more stunted plants were found to be almost completely destroyed. On July 1 a group of uninfested plants were set out in a cornfield near Shiloh, N. J., where the beetles are very abundant. These plants were examined at intervals during the feeding period of the adult beetle, but no evidence of feeding on the leaves was observed.

Milky disease of Japanese beetle larvae.--S. R. Dutky, Moorestown, reports that during the month of August the number of diseased larvae found at the regular larval-survey stations constantly increased in numbers, the smooth weekly figures being 7, 9, 25, 44, and 66. Of a total of 151 cases reported, 149 were the milky disease. The first milky-diseased first-instar larvae were picked up on August 8 and the first milky-diseased second-instar larvae were found on August 21. No third-instar larvae have been reported as affected. Artificial infection with the milky disease has been accomplished with Popillia japonica Newm., Ochrosidia villosa Burm., Autoserica castanea Arrow, and Phyllophaga larvae.

Protection of small and bush fruits from injury by adult beetles.--F. W. Metzger, Moorestown, reports that during the early part of the month the height of the beetle season was reached at Whitesbog, N. J., where traps are being used as a control for the beetle on cultivated blueberries. In general, the injury on the plants does not appear to be so severe as that observed during previous years. One field, located at a greater distance to the west than any of the others from the heavily infested beetle area, has always had a serious beetle infestation, for no apparent reason. The pine barrens at this point are generally infested, but there is no great concentration of beetles at any given point. Tests conducted during the month seem to indicate, however, that considerable numbers of beetles are attracted from the pines to the field, whether the wind is blowing from the field or to it. As traps located at some distance from the field do not capture as many beetles as those located along the edge of the cultivated area, it appears that the plants themselves exercise a considerable attraction for the beetle. Marked beetles were liberated 1 mile east of the field on days when the wind was blowing from the east and on other days when the wind was blowing from the west.

Approximately 2 hours after liberation, marked beetles were captured in the traps, regardless of wind direction. The insects apparently fly with the wind when there is no definite attraction but against the air currents when attracted to a certain locality.

Stomach poisons and repellents for adult Japanese beetle.--Tests were made this season by W. E. Fleming and F. E. Baker, Moorestown, with compound arsenates of the alkali and alkaline earth metals, prepared by the Division of Insecticide Investigations. As these materials had a very high water-soluble arsenic, they were mixed with an equal weight of hydrated lime before applying to the test plants. Materials used were calcium ammonium arsenate, calcium potassium arsenate, calcium sodium arsenate, and magnesium ammonium arsenate. These compound arsenates were not as effective as stomach-poison insecticides against the Japanese beetle as was acid lead arsenate. In view of the high water-soluble arsenic, there is a hazard in applying the materials to foliage.

"Oil greens" of little value for Japanese beetle.--Further experiments were conducted with different homologs of paris green prepared by the Division of Insecticide Investigations to determine their relative effectiveness against the adult beetle. It was apparent that these "greens" have little value as stomach-poison insecticides against the Japanese beetle.

Field treatment of nursery stock to destroy immature stages of Japanese beetle.--W. E. Fleming, F. E. Baker, and L. Koblitsky, Moorestown, report that in determining the absorption of arsenic by nursery plants growing in plots treated with acid lead arsenate, needles from *Buxus sempervirens*, *Pinus resinosa*, *Thuja orientalis*, *Thuja occidentalis*, *Tsuga canadensis*, *Juniperus virginiana*, and *Juniperus communis*, and leaves from *Clematis paniculata*, *Cercis chinensis*, *Cornus florida*, *Cornus alba*, *Callicarpa purpurea*, and *Deutzia gracilis* were analyzed for arsenic. The following table shows the arsenic content of the needles and leaves.

Shrub or vine	Parts As_2O_3 per million in plants treated with lead arsenate at rate of--		
	1,000 lbs. per acre	1,500 lbs. per acre	2,000 lbs. per acre
Buxus sempervirens	0.000	0.350	1.875
Pinus resinosa	0.125	0.225	4.625
Thuja orientalis	0.000	0.000	5.875
Thuja occidentalis	0.250	0.500	3.750
Tsuga canadensis	0.000	0.000	1.000
Juniperus virginiana	0.000	0.000	1.375
Juniperus communis	0.000	0.000	2.000
Clematis paniculata	0.250	0.750	1.000
Cercis chinensis	0.000	0.000	14.500
Cornus florida	0.000	0.000	3.750
Cornus alba	0.000	0.000	6.500
Callicarpa purpurea	0.250	0.500	0.850
Deutzia gracilis	0.000	0.000	5.900

Leaf samples for arsenic analysis were taken from Euonymus europaeus, Philadelphus coronarius, Lonicera fragrantissima, Lonicera morrowi, Lonicera tatarica, Rosa gardenia, Rosa sp. (Dr. Van Fleet), and Deutzia lemoinei.

Dispersion of Tiphia popilliavora Rohw., an imported parasite of the Japanese beetle.--M. H. Brunson, Moorestown, reporting on the status of the introduced parasite T. popilliavora, states that a total of 134 colonies of this species, each consisting of 100 females, were liberated in Pennsylvania and New Jersey during the month. The material used for this purpose was obtained by collecting from previously established colonies. A total of 13,715 female Tiphia were collected in 14 days at the rate of 298 females per day per man. Several colonies established in recent years were scouted to determine the spread of the parasite. It was found that the insect had spread distances from 1/2 to 2 miles from the original points of liberation. Observations also indicated that a continuance of carrot, the apparent sole food of T. popilliavora, is not necessary for the spread of the parasite. It was observed that in the area of spread of the parasite, there were frequently intervals of several hundred yards in which no wild carrot was to be found, and apparently it had not grown in these places for some years. It now appears that the presence of wild carrot is not absolutely essential for dispersion of the parasite. Forty-one colonies originally liberated in 1931 were scouted and recoveries of T. popilliavora were made at 19 of these.

JAPANESE BEETLE CONTROL

Corn borer scouting and survey started.--Work under an allotment of $116,000 for scouting and survey work in 19 States to determine possible spread and extent of infestation of the European corn borer was started during the week of August 12. This work is to be performed in order that measures may be taken by affected States and growers to control and delay further spread of the borer. Both scouting and survey work are to be performed in New Jersey, Virginia, Indiana, and Michigan. Scouting only will be carried on in Pennsylvania, Delaware, Maryland, Kentucky, Illinois, West Virginia, and Wisconsin. Operations in the 6 New England States and in New York and Ohio will be confined to a survey to determine the degree of infestation. Six district supervisors from the permanent corn borer inspection force were placed in the field to organize the work.

New infestations in nurseries.--Nursery and greenhouse scouting was completed in August in all except the New England States. Scouting in Connecticut, New Hampshire, and Maine will be discontinued on September 7 and in the remaining States on September 14. Similar activities in the regulated States south of Pennsylvania were terminated about the middle of August. August 31 was the date for discontinuing scouting of classified nurseries and greenhouses in Pennsylvania, New Jersey, and New York. A number of new infestations have been discovered on nursery premises in Maryland. Scouting in northern New Jersey has added greatly to the list of Class III establishments. At the conclusion of the scouting season there remained but few uninfested, classified establishments in the State. Many new infestations have been found in nurseries in Lancaster, York, Berks, and Dauphin Counties, Pa. No new finds have been made in the northern section of Pennsylvania. In New England beetles were found on the premises of 6 nurseries in Connecticut and within 500 feet of 6 other nurseries in that State. In Massachusetts beetles were collected on the properties of 2 nurseries. These New England finds were made during the first scouting of the premises this season. If possible, six scoutings will be made of the classified establishments in New England.

Fruit and vegetable inspection at peak.--A maximum of 123 employees was used during the month at the 37 fruit and vegetable inspection points established at important shipping points throughout the regulated area. Inspections at the Fredericksburg, Va., center required the employment of 19 inspectors. Owing to the large number of vehicles arriving with products for certification, causing traffic congestion in the Southwest Market in Washington, D. C., it was necessary to move the inspection platform at that point to a nearby parking lot. Beetles were found on cabbage, beans, and spinach at the inspection platforms in both Fredericksburg and Washington. Large quantities of beans were certified for movement from the Norfolk, Va., district. From June 15 to August 31, 2,159 beetles were removed from farm products and cut flowers inspected in the Philadelphia district. In general, the inspection of farm products in New Jersey was not as active as was anticipated. Bumper crops in Midwestern States practically closed the outlet for New Jersey products. Flight of the adult beetle decreased in the heavily infested area to such an extent that fumigation requirements on refrigerator cars containing bananas, onions, and potatoes were withdrawn late in August.

Japanese beetle trapping concluded in six States.--Trapping for the season in cities outside the regulated areas was largely concluded by the end of August. Traps had been lifted in all trapped cities in the States of Maryland, Michigan, North Carolina, South Carolina, Virginia, and West Virginia. Trap lifting was in progress in New York and Ohio. Still remaining in operation on August 31 were traps set in St. Louis, Mo., East St. Louis, Ill., Indianapolis, Ind., Erie, Pa., and at 18 points in Maine.

Soil treatment under way in St. Louis.--Application of arsenate of lead to infestations of the Japanese beetle disclosed by this year's trapping program outside of last season's treated area in St. Louis, Mo., began on August 8. By the end of August, 49 acres had been sprayed with lead arsenate at the rate of 1,000 pounds per acre.

High degree of gypsy moth infestation in inspected products.--More infestations were located in products submitted for inspection during the first half of August than in any similar period during the past 15 years. This condition was evidently caused by increased gypsy moth infestation throughout the infested areas. Among important finds made were 50 gypsy moth larvae, 174 pupae, and 4 egg clusters found on 3 carloads of lumber inspected at Wescott, Maine, for shipment to Brooklyn, N. Y.; 2 larvae, 22 pupae, and 6 egg clusters removed from 8 truck loads of lumber moved from Amherst, Mass., to Avon, Conn.; and 3 larvae and 11 pupae taken from a truck load of stone transported from South Deerfield, Mass., to Greenwich, Conn.

Gypsy moth scouting results.--Gypsy moth scouting was concluded during August in a tier of Maine towns within lightly infested territory and adjacent to generally infested towns. Finds ranging from 2 to 848 gypsy moth egg clusters were made in 27 towns in Franklin, Kennebec, Oxford, Somerset, and Waldo Counties, bordering the generally infested zone. In all except 2 towns, 10 or more egg masses were found. Certification records indicate that only 10 carloads of Christmas trees were inspected in these towns during the past year.

Dutch elm disease area increased.--Three confirmations received on August 5 extended the total of the New Jersey work area. All three confirmations are located in Holmdel Township, Monmouth County. One of the trees had a diameter of 86 inches. Confirmation of 4 trees in Sparta Township, Sussex County, N. J., and 1 in Tewksbury Township, Hunterdon County, N. J., further extended the line of infection. The latter is the first confirmation of the disease in Hunterdon County. Confirmations in New York which increased the infected zone in that State involved 1 elm located near Mahopac Falls on the southern border of Putnam County, and a second tree near Milltown, in the town of Southeast, Putnam County. The confirmed tree at Mahopac Falls was found upon removal to show symptoms of infection in the 1934 and 1935 annual rings. An isolated confirmed tree near Scott Corner, Westchester County, N. Y., filled in a noninfected gap in territory already included in the infected zone without enlarging the zone. In New York the easternmost diseased tree is approximately 40 miles from the center of infection, and the westernmost point within the infected zone is approximately 40 miles from the infection center.

Fourteen diseased elms found in cities remote from major infected area.--Early in the month additional experienced supervisors were placed in the field to scout for the Dutch elm disease in cities remote from the major infected zone. These cities were selected on the basis of their importance from the standpoint of importation of burl elm logs, transportation of the logs, or their final use in veneer mills. Accordingly, the men were assigned to Louisville, Indianapolis, Boston, Chicago, Norfolk, Philadelphia, Baltimore, Dayton, Cleveland, New Orleans, and Kansas City. These supervisors obtained personnel for scout crews through the National Reemployment Service in the respective cities. By the end of the month 83 scouts were engaged in this distant scouting. Of a total of 188 suspects collected and sent in for culture, confirmations were returned of 10 infected trees in Indianapolis and 2 each in Cleveland and Norfolk. Trees affected with the disease had been found in each of these three cities in previous years.

Great Piece Meadows area of New Jersey to be made elm-free.--On August 5 work began on a clean-cutting program in Essex County area No. 1. This section has a total area of 5.49 square miles. Fifty percent of the area is marsh or waste land containing one of the heaviest infection centers in the entire zone. All elm trees in this section are being felled.

FOREST INSECT INVESTIGATIONS

Sawfly parasites received from Canada.--P. B. Dowden, of the Melrose Highlands, Mass., laboratory, reports on a shipment of parasites of *Diprion polytomum* received from the Dominion Parasite Laboratory, Belleville, Ontario. The parasite material was received at Melrose Highlands on August 21 and was liberated the following day near Portage Lake in northern Maine by J. V. Schaffner, Jr., in an infestation of the European spruce sawfly. The adult parasites were in excellent condition at the time of liberation. The following table indicates the species received.

Species	Males	Females
	Number	Number
Exenterus marginatorius	75	2,529
Lophyroplectrus luteator	92	158
Microcryptus basizonius	1,476	2,174
Microplectron fuscipennis	[1] 1,190	[1] 28,810

[1] Estimated number of parasites of this species expected to issue from parasitized cocoons of the spruce sawfly which were placed in the field in wire cages. The sawfly cocoons were killed before being parasitized.

Gypsy moth attractants.--S. F. Potts, Melrose Highlands, reports on further developments concerning attractants to locate gypsy moth infestations. Results of this year's experiments show that a permanent type of mechanical trap caught 44 percent more moths than the tanglefoot trap now in use. It was found that the female tips may be discarded and the attractant may be stored in clear extract of known quantity and concentration per given volume in sealed ground-glass stoppered bottles, or preferably in vacuum-sealed cans. The extract stored in this way may be used in 15-tip dosages per trap instead of 30-tip dosages now used per trap.

Derris as a stomach poison.--Mr. Potts also reports that promising results have been obtained with derris as a stomach poison when oil adhesives are added. He states: "Although generally poor results have been obtained when uncoated derris was used as a stomach poison, very promising results were obtained on a number of insect species after exposure to varying periods of time and rain, when from 0.5 to 1.5 percent of castor oil, fish-oil, or linseed oil was added to the spray mixture."

Forest-type survey for gypsy moth.--W. L. Baker, Melrose Highlands, reports on a forest-type survey conducted in three Massachusetts towns. The areas surveyed in each town consisted of 18.25 square miles and the greater portion of these areas fell in the towns mentioned. Mr. Baker says that 2 weeks in August were spent in conducting forest-type surveys--1 week in Petersham, and 1 week in Beverly. J. E. R. Holbrook assisted in this work.

Fifty quarter-acre plots were located in each town. In Petersham 47 of the 50 plots contained tree growth, as compared to 30 of the 50 in Beverly. The remaining plots fell in tilled land, business districts, and pastures. Species of trees favored for the gypsy moth occurred in 40 of the 47 wooded plots in Petersham and 24 of the 30 in Beverly, or 85 and 80 percent, respectively. However, favored food trees predominated in but 19 percent of the wooded plots in Petersham, as compared to 33 percent in Beverly. These data may be compared with similar data from Concord, in which favored food trees occurred in 94 percent of the wooded plots and predominated in 54 percent. The gypsy moth was fairly destructive in Petersham in 1935 but occurred in damaging numbers only in practically pure stands of favored food trees. In Beverly no damage was done this season, and the gypsy moth was seen only in those plots falling in practically pure favored food stands. The Concord survey was made prior to the feeding season, when it was impracticable to obtain data on this year's infestation.

Control work effective against Douglas-fir beetle.--W. D. Bedard, of the Coeur d'Alene, Idaho, laboratory, recently conducted a survey of the Douglas-fir timber stands on the east side of Glacier National Park and reports that following control work conducted in the spring of 1934 the infestation of the Douglas-fir beetle (Dendroctonus pseudotsugae Hopk.) continues normal. Data taken from the vicinity of Upper St. Mary Lake showed a very low amount of infestation, most of the attacked trees being either windfalls or small suppressed trees. A survey of the Douglas-fir timber immediately adjoining the Park, on the Blackfeet Indian Reservation, indicated a 60 percent reduction in the Douglas-fir beetle infestation as a result of control measures conducted in the spring of 1935. This project had as its objective the protection of the Indian Service timber, as well as the safeguarding of the successful control work accomplished in the adjoining stands of the Park. Data obtained from this area showed an infestation of approximately 1/3 tree per acre, or 205 infested trees on the 641 acres infested. Owing to the proximity of valuable scenic Douglas-fir stands, it is deemed advisable to continue maintenance control in this area up to the time of emergence of the beetles in the spring of 1936.

Adult feeding habits of native elm bark beetle.--H. A. Crandell, of the Morristown, N. J., laboratory, reports that when adults of the native elm bark beetle (Hylurgopinus rufipes Eichh.) were confined with small healthy elm trees in cloth cages they fed not only on the twigs, particularly of the current season's growth, but also on the trunks. While this feeding was done under unnatural conditions, the observations suggest that similar injury may occur in the field.

No introduced bark beetles found at Cleveland, Indianapolis, and Norfolk.--During the month of August members of the Morristown laboratory staff, in company with workers of the Bureau of Plant Industry who are also stationed at Morristown, went to Indianapolis, Ind., Cleveland, Ohio, and Norfolk, Va., to examine trees infested by the Dutch elm disease and make observations in the immediate vicinity of these trees. While various native insects, or evidence of their attack, were noted on these elms, the examinations made indicate that neither of the European elm bark beetles, Scolytus multistriatus Marsh. nor S. scolytus Fab., has become established at these points. It has been thought that possibly the infections originated from elm logs of European origin that were shipped to or through the three cities and that either or both beetles might have been introduced.

Douglas-fir bark beetle aggressive following large fires in Oregon.--R. L. Furniss, of the Portland, Oreg., field laboratory, reports that many Douglas-firs are being killed during the current season in the northern coast counties of Oregon, owing to the activities of Dendroctonus pseudotsugae Hopk. Normally this species attacks weakened, felled, or fire-killed trees in the coast fir belt. However, because of a yearly succession of large fires from 1929 to 1933 in green timber in this area, an abundance of favorable host material was available in which the Douglas-fir bark beetle built up a huge population. In the spring of 1935 great numbers of these beetles emerged to find very few suitable trees to attack, as there was no large fire in 1934. As a result, some of the beetles filled in scorched trees adjacent to recent burns, but large numbers flew out into the green timber and attacked large groups of apparently normal trees. These groups are often many miles from the nearest burn of recent date and are attracting considerable attention from timber owners.

Black Hills beetle in lodgepole and limber pine.--J. M. Whiteside, of the Denver, Colo., laboratory, reports that recent caging experiments on Elk Mountain, near the Medicine Bow National Forest, Wyo., have confirmed the impression that far more brood of the Black Hills beetle (Dendroctonus ponderosae Hopk.) are developing to maturity under the bark of limber pine than in lodgepole pine in that locality. From emergence cages on 2 trees of each species, covering 8 square feet of bark surface, adult beetle emergence has been as follows: From limber pine, 193 beetles per square foot; from lodgepole pine, 20 beetles per square foot. Mr. Whiteside also reports that adults of the Black Hills beetle (Dendroctonus ponderosae Hopk.) emerging from lower elevations on Elk Mountain, northwest of Laramie, Wyo., were attacking many new trees near the top of the mountain before general emergence started at these higher elevations. This statement is based on evidence from emergence cages and attack records. It appeared that the adults emerging early in August at about 8,000 feet elevation were flying or being carried by the prevailing southwest winds to altitudes of 10,000 feet, where general emergence did not start until August 21. Prior to this date a sample strip 1 chain wide and 1 mile long, running from the base toward the top of the mountain, showed only 2 trees attacked in the lower half mile where emergence was far advanced, whereas in the upper half of the strip 122 newly infested trees were found, mostly in the last quarter mile, at from 9,800 to 10,000 feet elevation.

PLANT DISEASE CONTROL

Progress in barberry eradication.--Expansion of the barberry-eradication program in 17 States with W. P. A. funds was begun on August 1. On September 15 there were 1,814 men employed, 91 percent of whom had been taken from relief rolls. The field work is supervised by 131 agents who have had previous training and experience in plant disease control work.

Each supervisor is in charge of from one to four crews of from 5 to 10 men each, depending on the type of territory in which the work is being conducted. Subforemen have been obtained generally from among the men certified by the employment offices. On the basis of past experience, it is expected that the maximum number of men will be carried until about December 1.

Epidemiology of black stem rust.--In North Dakota this year the damage to Marquis wheat was found to range from 25 to 70 percent and to Ceres from 20 to 65 percent, while the Durums were much less severely injured. In weighing the samples it was evident that the excessively hot dry weather at the time most of the wheat was in the dough stage resulted in damage to the grain, even in fields of resistant varieties.

Summary of P. W. A. barberry-eradication program in Indiana.--From August 21, 1933, to June 30, 1935, National Industrial Recovery funds amounting to $32,615 were spent in connection with the barberry-eradication program in Indiana. Seventy-eight local laborers were employed for a total of 19,951 hours, making possible a survey of 1,009 square miles of territory in Allen, Dearborn, De Kalb, Elkhart, Fayette, Franklin, Henry, LaGrange, La Porte, Marion, Miami, Noble, Porter, Rush, Shelby, Steuben, Tippecanoe, Wabash, Wayne, White, and Whitley Counties. More than 12,000 bushes were destroyed on 298 properties.

Blister rust exhibit.--At the request of the Chairman of the Committee on Tree Conservation, a large outdoor blister rust control exhibit was placed at the Annual Flower Show at Bar Harbor, Maine, sponsored by the Garden Club of Mount Desert. This exhibit, which was 50 by 70 feet in size, was placed in an open space in a grove of native white pines ranging from 4 to 30 feet in height, with branch and stem cankers. Cultivated and wild Ribes (not infected) were displayed.

Ribes found in unusual locations.--In checking Ribes-eradication work around nurseries, it is interesting to note the unusual locations in which missed bushes were found. F. F. Franklin, in charge of this checking work in the North Central States, cites the following instances: In some nurseries in the North Central Region white cedars from swamps have been transplanted to form windbreak hedges along roadways in nurseries and among these cedars several Ribes have been found that were transported along with the ball of earth around the roots of the trees. At one nursery nine Ribes bushes were found growing under a house porch that was well within the nursery sanitation zone limit, and a 4-foot skunk currant was found growing beside a support for the overhead sprinkling system. At another, a Ribes cynosbati bush with 21 feet of live stem was found growing on an old log-sand crib. At still another, several R. cynosbati seedlings were found growing within the white pine seed beds. Apparently the Ribes seed was introduced there through woods dirt used in making compost. The compost was then used in preparing the seed beds.

Emergency relief workers swell ranks of blister rust fighters.--By August 31, 8,682 workers under the emergency relief program had been put to work on the blister rust control project. The States of Idaho and

California had the greatest number of these workers, 1,280 being engaged in Idaho and 1,223 in California.

W. P. A. workers eradicate Ribes in Virginia.--During the month of August, 36 W. P. A. workers in Virginia eradicated 12,865 wild and 31 cultivated Ribes on an area of 1,797 acres. This work extended over four counties and consumed a total of 3,178 man-hours of labor.

COTTON INSECT INVESTIGATIONS

Improved agitator for duster.--The vertical agitator designed by D. A. Isler, of the Bureau of Agricultural Engineering at the Presidio, Tex., pink bollworm laboratory, was installed on a power duster and performed very satisfactorily in field tests with barium fluosilicate and sulphur-derris mixtures. An adjustable feed lever stop was also constructed so that the feed could be cut off when turning at the row ends and cut on again to exactly the same setting.

Rearing pink bollworm parasites.--L. W. Noble and assistants, of the Presidio laboratory, report excellent results from a new rearing method which is being used for the pink bollworm parasite Microbracon kirkpatricki Wilk. recently introduced from Egypt. They state: "The oviposition cage is a wooden frame 12 by 13 by 14 inches, inside dimensions, with the cloth cover fastened on the inside to prevent the parasites from wedging themselves between the cloth and the wood frame. The host larvae are exposed in embroidery hoops. They are confined between a sheet of heavy paper and a piece of cloth stretched in the hoop. The hoop is fastened on the outside of the cage with the cloth pressed against the cloth cage cover. The parasites oviposit through the two layers of cloth, that of the cage cover and that fastened in the hoop. By this method the host larvae are exposed without opening the oviposition cage. The hoops are removed and a fresh lot of larvae exposed every 24 hours. The host larvae with the young parasite larvae are allowed to remain in the hoops until the parasites have completed development and spun cocoons. All of these cocoons are attached to the sheet of paper, allowing removal of the pieces of cloth without disturbing the spin-ups. The pieces of paper containing the spin-ups may be placed in emergence cages or prepared for shipment."

Another pink bollworm parasite.--Mr. Noble also says that the second generation of the Hawaiian parasite Chelonus blackburni Cameron, bred from a small lot of material received in June, began emerging late in August. This species was found to breed on Ephestia kuehniella Zell. and Sitotroga cerealella Oliv., although the specimens are considerably smaller than those developing on pink bollworms. Small liberations of Exeristes roborator Fab. were made in Mexico in August by C. S. Rude, who is continuing the breeding work with this species for further liberation.

Longevity of boll weevils.--G. L. Smith, et al., Tallulah, La., report that in May 1935, 35 boll weevils emerging in hibernation cages where they had been placed during the fall of 1934 were placed in screen cages in the insectary and were supplied daily with fresh cotton plants or squares for food. Twenty-one, or 60 percent, died in May and June; 6, or 17 percent, in July; and 6, or 17 percent, in August, leaving only 2, or nearly 6 percent, of the weevils still alive on September 1, 1935.

Notes on flight-screen collections of boll weevils.--R. C. Gaines and G. L. Smith report that the flight-screen collections of boll weevils at Tallulah indicate a smaller August boll weevil population than during any of the 5 previous years. The number of weevils caught per flight screen during August 1935 was only 13, as compared to 43 in 1934, 151 in 1933, 134 in 1932, and 78 in 1931. The small boll weevil population during August 1935 was undoubtedly due to the high temperatures and drought during July and August, which caused cotton to mature unusually early, leaving very few squares and young bolls for weevil food and breeding. The collections made during August on the three revolving flight screens confirm previous observations that the boll weevil has a tendency to fly against the wind. In August 1935, 4 weevils were caught on the windward side of the screens while 13 were caught on the leeward side. During the same month in 1934, 22 weevils were caught on the windward side and 43 on the leeward side of these screens.

Boll weevil parasite studies.--P. M. Gilmer, et al., report that by the end of August boll weevil infested cotton squares had been placed in 139 cages for parasite emergence at Tallulah and emergence had been completed in 89 cages. In August all parasites and weevils were removed from 60 cages representing collections made at 41 points in four States. Two of the cages contained cotton squares from Arkansas; 6 contained squares from Alabama; 20, squares from Louisiana; and 32, squares from Mississippi. From the 30,644 squares in the 60 cages there emerged 15,693 boll weevils and 1,100 parasites, of which 962 have been tentatively determined as Microbracon mellitor Say and 138 as other species. The percentage of squares containing boll weevil parasites ranged from 0 to 32.80 percent of the productive squares. This high percentage of parasites was from 402 cotton squares collected at Aberdeen, Miss., on July 16, 1935. Four collections--2 from Aberdeen, Miss., 1 from Starkville, Miss., and 1 from Gallion, Ala.--had over 20 percent parasites. The average percentage of parasites remained persistently high from collections made at Aberdeen, Starkville, and Stoneville. An attempt was made with the data at hand to discover whether there was any significant increase in percentage of parasitization during the season. The data to date are insufficient to afford any basic generalizations but seem to support rather well the viewpoint that there is little or no build-up at any time and that the small increase that does appear is lost late in the season, apparently rather from decrease in parasite activity than from increase in boll weevil numbers, as the percentage of productive squares has shown little increase. The very hot weather seemed to react less unfavorably upon parasites than upon weevils, as it was accompanied by slight increases in parasite percentages which were lost with the return of cooler weather. In general, parasitization just about held its own with weevil increase, resulting in a rather stable percentage through the month. One or two points again showed a slow build-up, notably at Starkville, while at Natchez there seemed to have been a steady decline in percentage, which, although very small, was consistent from collection to collection.

Cage toxicity tests for flea hopper.--K. P. Ewing and R. L. McGarr submit the following data on insecticides and combinations of insecticides used in cage toxicity tests for the cotton flea hopper at Port Lavaca, Tex.

Insecticide	Concentration	Mortality		
		Adults	Nymphs	Average (both stages)
	Percent	Percent	Percent	Percent
Paris green-sulphur [1]	5.0	64.8	67.6	66.2
Do [2]	7.5	80.7	71.6	76.2
Do [1]	10.0	66.2	77.9	72.1
Calcium arsenate sulphur	10.0	44.9	76.3	60.6
Do	20.0	49.2	70.8	60.0
Do	33.3	49.0	66.7	57.9
Sulphur	---	43.0	78.8	60.9
Phenothiazine	---	39.2	19.5	29.4
Phenothiazine with 50 percent clay	50.0	35.7	28.8	32.3

[1] Mixed by machine at Tallulah.

[2] Mixed by hand just before using.

The average mortality in 22 check cages was: Adults, 16.8; nymphs, 23.5. These mixtures of paris green and sulphur were also tested in the field this year. Two applications gave very good control of the flea hopper and caused no burning of the foliage. To further test the effect on the plant, from 3 to 6 applications of the different paris green-sulphur mixtures were applied to late cotton at the rate of 18 pounds per acre per application without causing any burning even in the presence of heavy dew.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Gin-trash inspection.--Gin-trash inspection of the 1935 cotton crop is now well under way. This work was begun early in August in the lower Rio Grande Valley of Texas and adjacent areas in Mexico, and also in the Don Martin Project, located about 40 miles in the interior of Mexico opposite Laredo, Tex. All of these areas have now been completed. The machines have moved northward as the season progressed and are now being operated in central and west-central Texas. Inspections are just getting under way in Louisiana and Mississippi, an inspection crew being located in each State. Inspections were begun in the regulated areas of Florida and Georgia and adjacent territory about the middle of August, and by the end of the month 11 machines were in operation. The results of all gin-trash inspection to date have been negative. As gin-trash inspection goes forward, arrangements are being made to collect green bolls for future laboratory inspection in the sections not covered by gin-trash inspection.

Trap-plot cotton in the Big Bend area of Texas.--The trap-plots of cotton in the Castolon section were continued until the middle of the month, at which time two of them were discontinued. From these two plots 69,862 blooms had been inspected in the first half of the month and 647 worms were found. The other plot was worked during the entire month, 137,405 blooms being inspected and 10,520 worms being found. In the plots that were discontinued all infested blooms were picked daily, and 738 such blooms were collected during the last half of the month. The last few days of August some 38 bales of cotton was ginned at Presidio. The trash was not put through a machine, but an inspector made a general examination by hand and found that there were very few pink bollworm larvae at this time.

Road-station inspection.--The inspection station at the junction of the Presidio and Ruidosa roads, about a mile and a half south of Marfa, Tex., was reopened on September 3. This station is for the purpose of preventing the movement of infested material from the Big Bend area of Texas. The station will be operated on a 24-hour basis by 4 temporary inspectors, 3 of whom have had previous road-station experience.

Thurberia weevil clean-up in Arizona.--Late in August the eradication of Thurberia plants in the regulated area of southern Arizona was begun with funds provided by the P. W. A. These funds permit the employment of 227 men for 1 year. Equipment was essential to start activities and, as some of this has not been received, the work has naturally been handicapped. During the last few days of the month some 72 men began the actual work of removing the plants and the progress being made is very gratifying. Some of the laborers have been out of work for a considerable time and they are very enthusiastic and seem to be interested in the work. For the 5 days of the month during which eradication work was performed, some 15,900 Thurberia plants were removed. As soon as the necessary supplies are received the remainder of the personnel will be employed.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Officials visit control areas.--In June J. H. French, secretary of the Pennsylvania Department of Agriculture, accompanied by deputy-secretary W. S. Hagar and R. H. Ball, director of the Bureau of Plant Industry, visited the gypsy moth infested area in Pennsylvania and observed the spraying, cutting work, etc., which was done or was in progress at that time. This was Mr. French's first visit to this area and he was very much interested in the work and the organization. On July 5 a number of gypsy moth foremen from the Massachusetts and Connecticut C. C. C. camps visited a number of the towns just east of the Connecticut River, in Massachusetts, to observe the widespread gypsy moth defoliation. A C. C. C. camp superintendent and representatives from the office of the commissioner of conservation of Massachusetts also attended. During the latter part of June and the early part of July the following-named men visited much of the territory heavily defoliated by the gypsy moth: L. S. McLaine, chief, division of foreign pest suppression of Canada, and his assistant, William Keanan; H. L. McIntyre, director of forest pests and diseases of New York Conservation Department; N. R. Trafton, of the Maine Department of Agriculture; J. T. Ashworth, deputy in charge of gypsy moth control in Connecticut; Messrs. Davis and Hanley of the gypsy moth office at Wilkes-Barre, Pa.; H. A. Ames, in charge of gypsy moth work in New Jersey; A. F. Hawes, State forester of Connecticut; and Messrs. Brown, Baker, and McAloney of the forest-insect laboratory at Melrose Highlands, Mass.

Autogiro aids in gypsy moth survey.--During early July, colored moving pictures of large gypsy moth defoliated areas, just east of the Connecticut River, were taken from an autogiro. This is the first time colored films have been used in taking pictures of gypsy moth defoliation from the air. This type of plane made it possible to obtain a nearer view of the defoliated areas from above. These films have been finished, presented for criticism, and are now being put in final shape for showing.

Notes on personnel.--In August men thoroughly experienced in gypsy moth control work were detailed to Maine and New Hampshire to survey a part of certain Counties where work is planned in order to locate areas where gypsy moth egg clusters are fairly abundant. These areas are to be used in training inexperienced men for gypsy moth work, such as thinning, cutting, scouting, and creosoting of egg clusters. After the men have secured sufficient training, and transportation is available, these men will be assigned work in districts where the infestations are much lighter. Up to August 28, 1935, under the W. P. A. emergency projects a total of 982 workers have been requisitioned under the gypsy moth project, 559 having reported for work in the States as follows: New Hampshire, 12; Vermont, 30; Massachusetts, 123; Rhode Island, 27; Connecticut, 117; and Pennsylvania, 232. Most of the workers obtained are inexperienced and have not been employed for some time. Those obtained thus far are performing reasonably satisfactory work. In the Pennsylvania area a small group left the work, apparently being dissatisfied with their wages.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Crude naphthalene effective against wireworms.--M. C. Lane, of the Walla Walla, Wash., laboratory, reports that a recent large-scale field test has demonstrated conclusively the value of crude naphthalene in combating wireworms under conditions existing in the State of Washington. In these tests crude naphthalene was applied at the rate of 800 pounds per acre. The land was plowed 12 inches deep with a riding plow set to cut a 9-inch furrow slice. The crude naphthalene crystals were applied to the sides of the open furrows immediately behind the plow. After the plowing was completed the soil was thoroughly disked to obtain a complete mixture of the naphthalene and the soil. After disking the soil surface was packed with a platform "float" in order to retain the gas in the soil. Before treatment the 2-acre field contained an average of approximately 38 wireworms per square foot in the top 12 inches of soil. Ten days after the completion of the treatment a similar examination revealed an average of only 1 wireworm per square foot, an apparent reduction of approximately 97 percent as a result of the naphthalene treatment. The cost of the treatment averaged approximately $24 per acre. The principal species of wireworms concerned were the sugar beet wireworm (*Limonius californicus* Mann.) and the Pacific coast wireworm (*Limonius canus* Lec.).

Nicotine sulphate-fish oil soap gives promising results against tomato pinworm.--J. C. Elmore, Alhambra, Calif., reports that in recent laboratory tests it was indicated that a combination of nicotine sulphate (1-800) and fish oil soap (1-200), in water, may prove of considerable value in combating the tomato pinworm (*Gnorimoschema lycopersicella* Busck) when directed primarily against the egg and the leaf-mining stages. Preliminary tests thus far have indicated a reduction of approximately 92.6 percent in pinworm moth emergence from tomato plants treated with the nicotine sulphate-fish oil soap preparation, as compared to untreated plants.

Derris dusts effective against cucumber beetles when applied directly.--Reporting on a series of tests with three species of cucumber beetles (*Diabrotica* spp.), K. B. McKinney, of the Phoenix, Ariz., laboratory, states that the direct application of a derris-talc dust mixture containing 1 percent rotenone killed from 36.1 to 99.8 percent of the adult beetles, as shown by the examination of the beetles 24 hours after the dusting was completed. In these tests the beetles were collected by the sweep-net method from wild gourd vines on the desert. They were liberated within a screened enclosure and were treated with the dust mixture after they had settled on the screen. Judging from the results obtained in these tests, it seems possible that derris dust mixtures containing approximately 1 percent of rotenone should prove very effective when applied directly to cucumber beetle adults. The species involved in these tests were the striped cucumber beetle (*D. vittata* Fab.), the spotted cucumber beetle (*D. duodecimpunctata* Fab.), and the banded cucumber beetle (*D. balteata* Lec.).

Sprays superior to dusts in control of Mexican bean beetle in Virginia.--R. W. Brannon, of the Norfolk, Va., laboratory, reports that preliminary results from a large-scale control experiment on lima beans in the field at Mappsville, Va., have indicated that, in general, sprays gave better foliage protection against the Mexican bean beetle than did dusts. A spray composed of 3 pounds of synthetic cryolite in 50 gallons of water and a derris-root-powder spray containing 0.025 percent rotenone, gave perfect foliage protection against the bean beetle and increased the yield 38 and 33.5 percent, respectively, as compared to similarly situated untreated plots. A dust mixture composed of synthetic cryolite and talc (60-40) and a derris-talc dust containing 0.22 percent rotenone, gave fairly satisfactory results and increased the yield 32.9 and 23.8 percent, respectively, as compared to untreated plots. These materials were applied with a traction duster and traction sprayer, respectively, on half-acre replicated plots.

Macrocentrus ancylivorus parasitizes larvae of lima bean pod borer.--Rodney Cecil, of the Ventura, Calif., laboratory, reports that adults of the parasite *Macrocentrus ancylivorus* Rohw. have emerged from larvae of the lima bean pod borer (*Etiella zinckinella* Treit.), to which they were exposed in experimental tests. Adults of this parasite were shipped from the Moorestown, N. J., laboratory, in an attempt to determine their possible utility as a natural enemy of the lima bean pod borer. As it has been demonstrated that M. ancylivorus will parasitize the larvae of E. zinckinella, the effort will be continued to determine whether it is possible to establish this parasite in the Ventura district as a possible aid in the control of the lima bean pod borer.

Ground root of fetid wild gourd and manroot show promise as insecticides.--In preliminary tests with the ground root of fetid wild gourd (Cucurbita foetidissima) and manroot (Echinopcystus fabacea) against nearly full-grown larvae of the imported cabbage worm (Ascia rapae L.), R. E. Campbell, of the Alhambra, Calif., laboratory, reports that these materials exhibited a marked toxic and deterrent effect on the worms. The tests included the application of the finely ground root in a pure state and also diluted with equal parts of talc by weight. A precision duster and settling cone chamber was used in applying 1 gram of the dust per cabbage plant. When the wild gourd root was used the percentage of worms killed ranged from 17.5 to 20. With the manroot the percentage of kill ranged from 5.0 to 55. It is planned to continue tests with these materials in order to determine more definitely their possible utility as insecticides.

INSECTS AFFECTING MAN AND ANIMALS

Screw worm incidence shows slight increase in Southeastern States.--During the third week of August there was a slight increase in the number of screw worm cases in livestock in southeastern Texas, Louisiana, Mississippi, Alabama, Florida, Georgia, and South Carolina. This is accounted for by the increased activity of the Gulf coast tick, one of the principal predisposing causes of screw worm attack in the Southeast. Reports from certain sections of southwestern Texas indicate that there was a noticeable decrease in screw worm infestations in that area during the latter part of August on account of the hot, dry weather.

Bureau may undertake pest-mosquito control project.--In order to meet requests from various States and local communities that the Federal Government undertake control measures against pest mosquitoes, to lessen the danger of outbreaks of certain diseases carried by these insects, and to insure that work of this kind may be carried out with the least possible detriment to wild life and other natural resources, the Bureau of Entomology and Plant Quarantine has made application to the Works Progress Administration for an allotment of $34,095,361 to carry on this work. The project is designed to furnish employment to 53,236 laborers now on relief rolls and to provide for employing 1,385 additional men for a period of 12 months. Of the total cost of the project, 85.9 percent is to be used for wages for relief labor, 5.5 percent for supervision, and only 8.6 percent for expenses other than wages. The average annual salary of all men employed on the project will be $639.86. If the project is approved by the Works Progress Administration, pest-mosquito control work will be conducted in 29 States and the District of Columbia.

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Living larvae of the Mediterranean fruit fly were intercepted at Boston on June 21 in grapefruit in stores from Palestine. This fruit fly has been taken previously in oranges from Palestine. Seven adults of the lygaeid *Nysius huttoni* B. White were intercepted at New York on May 29 on apples in cargo from New Zealand. A nest containing living immature larvae of the brown-tail moth (*Nygmia phaeorrhoea* Don.) arrived at Washington, D. C., on March 5, 1934, with a pear tree in the express from Italy. A living nymph of the cricket *Liphophus kanetataki* Matsumura was found at Seattle, Wash., on June 11 in a basket of *Dioscorea* in baggage from China. A living larva of *Psylliodes chrysocephala* L. was taken at Houston, Tex., on June 10 in a turnip in stores from Argentina. This is our first record of this chrysomelid being intercepted from Argentina. Living specimens of the coccid *Phenacoccus azaleae* Kuw. arrived at Philadelphia on February 20 on leaves and stems of azalea in ship's quarters from Japan. Twenty-seven living larvae of the pink bollworm (*Pectinophora gossypiella* Saund.) were taken at Washington, D. C., on December 19, 1934, in unginned cottonseed in the mail from Greece. This represents the first record in our files of this insect being intercepted from Greece. A larva of the pyralid *Ancylostomia stercorea* Zell. was taken at New York on May 27 in a pigeonpea (*Cajanus indicus*) in baggage from Puerto Rico. A living adult of *Anchastomorphus suturalis* Cand. arrived at Baltimore, Md., on April 29 with banana debris in cargo from Colombia. This is the first record in our files of this elaterid being intercepted. A living adult of the leaf beetle *Doryphora princeps magnifica* Stal was taken at Charleston, S. C., on April 15 with banana debris in cargo from Honduras. *Coccus capparidis* (Green) was intercepted at San Francisco on June 17 on orchids (*Cypripedium fairieanum* and *C. villosum*) in the mail from India. A living adult of the mango weevil (*Sternochetus mangiferae* Fab.) arrived at New Orleans on June 10 in a mango in crew's quarters from the Canal Zone. A member of the crew stated that he obtained the mango fruit in the Canal Zone. This represents our first record of this weevil being intercepted from the Canal Zone; however, as the vessel sailed direct from Honolulu it is possible that the mango came from Hawaii.

Pathological interceptions of interest.--The first interception of *Ascochyta berberidina* Sacc. was made at Seattle on April 24 on barberry from Germany. *Ceratostomella* sp., unlike *C. fimbriata* Elliott, was intercepted on taro from China on April 24 at New York. *Cladosporium carpophilum* Thuem. was intercepted from Japan for the first time on August 11, at San Pedro on peaches. The first interception of the genus *Cryptodiaporthe*, *C. salicina* (Curr.) Wehm., was made at Seattle on April 16 on willows from Belgium. *Gloeosporium catechu* Syd. was intercepted on April 12 at Seattle in betel nuts from Guam. *Gloeosporium* sp., with spores smaller than for species reported on host, was intercepted at New York on April 19 on *Hoya carnosa* from Italy. *Pestalozzia glandicola* (Cast.) Guba was intercepted (first interception) on oak from Japan on March 25 at Seattle. *P. macrotricha* Kleb. was intercepted (first interception) on rhododendron from England on April 5 at Seattle. *Phoma ejiciens* Pass. was intercepted (first interception) on camellia from Japan on April 5 at Seattle. *P. gulibrissen* Pass. and Roum. was intercepted (first interception) on *Albizzia lebbek* from British West Indies on March 27 at New York. *P. pachytheca* Vesterg. was intercepted (first interception) on willows from Belgium on April 16 at Seattle. *Phyllosticta* sp., no species reported on host genus, was intercepted on April 8 at Seattle on *Shortia uniflora* from Japan. *Physalospora cattleyae* Maubl. & Lasnier was intercepted on May 2 at New Orleans on *Cattleya skinneri* from Guatemala. The only previous interception of this disease was made in 1915 on orchids from Colombia. The first interception of *Puccinia magnusiana* Koxern. was made on May 27 at New York on *Phragmites communis* from China. The first interception of *Pucciniastrum myrtilli* (Schum.) Arth. was made on July 29 at Seattle on *Vaccinium* sp. from Yugoslavia. *Rhabdospora* sp. (no species reported on host) was intercepted on April 5 at Seattle on camellia from Japan. *Septoria gladioli* Pass. was intercepted on crocus for the first time on August 5 at New York in bulbs from Holland. *Septoria rubi* Westd. was intercepted (first interception) on thimbleberry from Canada on August 12 at Seattle. *Sphaeropsis* sp., similar to *S. malorum* Pk., was intercepted in sweetpotatoes from Sierra Leone on May 13 at Boston. *Sphaerulina* sp., no species reported on host, was intercepted at Seattle on April 8 on peony from Japan. *Tilletia horrida* Tak. was intercepted in paddy rice at Seattle on April 15, first interception from Siam.

Fruit fly on Spanish liner in Puerto Rico.--Inspectors detailed to inspect the stores of a Spanish liner entering San Juan in September took small samples of the various fruits in the ship's stores and started to work on them. Soon larvae of the Mediterranean fruit fly (*Ceratitis capitata*) were found, every pear examined yielding 2 or more. Actual counts for these 7 pears were 42-18-19-6-27-8-2 larvae. In addition to the pears, 1 of the 6 apples was found to contain 3 larvae. To quote from the report, "It is also interesting to note that 1 pear, selected as probably free from infestation, had 19 larvae, while another, which the ship's steward swore was clean, had 2 larvae." The presence of fruit infested with fruit flies in ships' stores of vessels arriving at tropical ports represents the maximum of pest risk. Not only is the climate admirably suited to the rapid and continued development of these pests but there is an abundance of preferred host fruits available. This incident forcibly illustrates the need for prompt and careful inspection of fruit in ships' stores on vessels arriving from countries in which fruit flies are known to occur.

Spanish peaches infested with fruit fly.--Of 126 Spanish peaches found in a ship's stores in Boston on September 2, all showed evidence of attack by the Mediterranean fruit fly. Of 30 cut open, 25 contained living larvae, 59 being the largest number found in any one fruit. Another peach found in a passenger's baggage contained 8 living larvae. All of this infested fruit was burned.

DOMESTIC PLANT QUARANTINES

Relief workers inspect peach trees for mosaic disease.--Reports from the manager of the project on control of peach mosaic show that up to September 7 inspection had been made of 467 properties and 94,554 peach trees in Delta County, Colo. No peach mosaic was found in the area inspected. Sixteen men from relief rolls were being employed in crews of 4, under the immediate supervision of a trained inspector. Other crews are to be employed for inspection work in Mesa County, Colo., as soon as the peach crop is harvested.

Progress in phony peach disease inspection.--The project leader reports that the season's work in inspection of home and commercial orchards for the phony peach disease has been completed in 7 States, of which 2, New Jersey and West Virginia, yielded no instances of known infection, and 2, Maryland and Kentucky, were found infected this season for the first time. The infected counties in Maryland are Washington and Worcester. Those in Kentucky are Henderson, Graves, Union, and Webster.

Field headquarters changed.--The field headquarters for phony peach disease eradication, which have been maintained at the peach-disease laboratory, Fort Valley, Ga., for several years, were moved on August 22 to 308 Ten Forsyth St. Building, Atlanta, Ga., a location which is proving to be much more advantageous in the efficient administration of the relief project on the control of the phony peach disease. The Texas headquarters for citrus canker eradication were moved from the old Federal building at Houston to Room 315, Citizens State Bank Building, in the same city, and a temporary field office has been established in the Rio Grande National Life Building at Harlingen.

Cactus burners used for killing Citrus trifoliata seedlings.--Seedlings of the Citrus trifoliata are produced in such great numbers as to present a problem in connection with the eradication of escaped Citrus trifoliata for control of the citrus canker. A portable type of blow-torch, locally known as a "pear burner", because of its use by stockmen in burning the spines from the prickly pear, is being used with apparent success to burn the seedlings and litter containing the seeds.

Progress of citrus canker eradication under P. W. A. funds.--Relief workers employed in the Harlingen, Tex., area on the citrus canker eradication project have accomplished the destruction of 56,360 trees in the Harlingen area and 33,178 in the Brownsville area up to September 1, according to reports from field headquarters. Most of these were overgrown and abandoned nursery trees. Abandoned orchards are next to be worked. The volume of work is increasing in the lower Rio Grande Valley, a sufficient number of applications having been received to keep the 200 laborers busy for the next 3 months.

Citrus canker again found in Louisiana.--Inspectors report that at Schriever, Terrebonne Parish, La., where the disease was found a year ago, citrus canker was again recently located on an escaped Citrus trifoliata tree. All trifoliata trees in this area are now being destroyed by the use of relief labor. This infection is not near the commercial citrus plantings of the State.

Railway cars from Japanese beetle area inspected.--Inspections of cars of produce arriving at Chicago and Cincinnati from the areas infested with the Japanese beetle were continued during August, the season when the beetle is in flight, and one live beetle was found as a result of the inspection of 75 cars.

Azalea flower spot quarantine proposed.--The Maryland Nurserymen's Association went on record at a recent meeting as favoring a public hearing looking to the establishment of a quarantine of areas in the South that are infected with the azalea flower spot. The State of Alabama placed a quarantine last April, prohibiting the entry of azalea from South Carolina, where the disease was first recorded in the Charleston area. The State of California requires certification as to this disease in shipments of azalea from South Carolina, Georgia, and Florida.

BEE CULTURE

Beekeepers manifest interest in A. A. A.--The beekeepers have been very much interested in the status of the Agricultural Adjustment Administration, because the marketing agreement covering the sale of package and queen bees is involved. The Alabama State Beekeepers' Association, at its recent meeting, went on record as favoring for another year the continuance of the prices established last year under this agreement.

Maryland honey exhibit judged.--On September 3 C. E. Burnside, Somerset, Md., officiated as judge of apiary products at the Maryland State Fair at Timonium. He reports that the exhibits of both comb and extracted honey were of excellent quality. The combination exhibits were especially attractive. The number of entries were less than expected, probably on account of inclement weather.

INSECT PEST SURVEY AND INFORMATION

Suggestion on photographing insects.--J. G. Pratt, bureau photographer, says that the pinning into position of insects, especially minute Coleoptera, can be greatly facilitated by making a fork at the end of a standard insect pin with a pin of the minuten variety and a bit of solder. The operation is simple and it takes but a few minutes to make an adequate supply. File off the paint where the joint will come; stick the two into cork in the desired position and touch the joint with an electric soldering iron. For minute Coleoptera, 2 minuten pins can be used. The great advantage in controlling the position of an insect leg or antenna with a single pin is readily apparent.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

The mosquito Aedes fulvus Wied. in Cuba.--Carlos G. Aguayo, of Havana, Cuba, recently brought in three specimens of A. fulvus, collected at Cacocum, Oriente Province, Cuba, on July 25, 1935. Dr. Aguayo said that this species is very abundant and is much feared by the natives because of its ferocity. This is the first Antillean record of a species known from North Carolina south through Central Amercia to Brazil.

A European pemphredonid wasp and its parasite in the United States.--On several occasions in the past 2 years, F. D. De Gant, of Cleveland, Ohio, has sent in specimens of an ichneumonid which he had reared, along with its wasp host, from rose stems in his garden. The parasite has been identified by R. A. Cushman as Perithous divinator (Rossi), a European species not heretofore recorded from North America. Grace Sandhouse has identified the wasp, with some question, as *Pemphredon* (*Dineurus*) *lethifer* (Shuckard), a species recorded in European literature as one of the hosts of *P. divinator*. It has not previously been recorded from North America, although the collection of the National Museum contains specimens from Rosedale, Mass.; Philadelphia, Pittsburgh, and North East, Pa.; Baltimore, Md.; Washington, D. C.; Cleveland and Wooster, Ohio; Detroit, Mich.; Chicago, Ill.; and Webster Grove, Mo. All but the Philadelphia specimen, which was captured in 1909, have been collected since 1922. Many of them were reared from rose or blackberry stems.

Males of Dinocampus coccinellae (Schrank) discovered.--In the course of a study by C. F. W. Muesebeck of material in the National Museum belonging to the braconid subfamily Euphorinae, two male specimens of *D. coccinellae* have been discovered. This species, which is a common cosmopolitan parasite of adult Coccinellidae, has been supposed to occur only in the female sex. The recording of a male in 1834 by Nees von Esenbeck (whose collection has since been destroyed) has been generally regarded as probably representing a misidentification. The two male specimens in the National Collection are from California and were reared, respectively, from *Hippodamia convergens* Guer. and *Coccinella californica* Mannh.

Chinch bug egg parasite found in Virginia.--*Eumicrosoma benefica* Gahan, a minute telenomine parasite of the eggs of the chinch bug (*Blissus leucopterus* Say) appears to have been reported only from certain States west of the Mississippi, specifically from Kansas, Iowa, and South Dakota, and from Illinois following introduction from Kansas. Recently, however, F. F. Dicke, of the Division of Cereal and Forage Insect Investigations, submitted specimens, identified by C. F. W. Muesebeck as this parasite, which were reared from eggs of *Blissus hirtus* Montd., at Arlington Farm, Va.

A West Indian species of Miridae injurious to tobacco in Florida.--Specimens of two species reported by A. W. Morrill, Jr., on August 7, as being abundant on tobacco plants at Quincy, Fla., have been identified by H. G. Barber as *Cyrtopeltis varians* Distant and *Dicyphus mimus* Uhler, respectively. The former has not previously been reported as injurious to tobacco in the United States, although known as a tobacco pest in Cuba and Puerto Rico.

A European leafhopper in western United States.--On June 27 at Nicolaus, Calif., and July 5 at Puyallup, Wash., P. W. Oman collected specimens on cottonwood which he has identified as *Idiocerus albicans* Kbm., apparently the first records for this species from North America. There has also been received for identification a single female of an *Idiocerus*, collected at Pullman, Wash., on October 13, 1929, which Mr. Oman tentatively placed as *I. fulgidus* Fab. Both are European forms living on *Populus*. Mr. Oman suggests that, if the latter identification is correct, all the above-mentioned specimens probably represent but a single species, as material in the National Collection under the name *albicans* does not appear to be specifically distinct from that considered to be *fulgidus*.

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FRUIT INSECT INVESTIGATIONS

Dispersion habits of dried-fruit beetle.--D. F. Barnes, of the dried-fruit insects laboratory at Fresno, Calif., has conducted extensive experiments to obtain information on the dispersal habits of the dried-fruit beetle. Using the methods outlined in No. 51 of the Bureau's ET series entitled, "Methods and apparatus for studying dispersion of nitidulids", 56,600 beetles from decaying oranges were stained and placed in paper bags for liberation. Owing to high temperatures, crowded containers, and, perhaps, to the effect of the eosin stain, 8,677 beetles, or 15.3 percent, died. The net number released was 47,900. A large area of abandoned fig trees about 20 miles east of Fresno and apart from the main areas of productive fig acreage was chosen for the experiment. Twenty-six standard dried fruit beetle traps, baited with fermenting dried peaches, were distributed along two intersecting straight lines, one running from north to south and the other from east to west. The point of liberation was the intersection of the lines. It was shown that beetles may move more than 1,800 feet in less than 24 hours and that it is possible to recover them at distances of about 9,500 feet after 6 days. Unmarked beetles in considerable numbers (490 on August 12) came to traps set in non-fruit-producing areas. The traps on the east line, especially, were remote from areas where the beetles were expected to be found. This area is near the foothills and consists of uncultivated land, grain stubble, and summer fallow, wholly inhospitable, one would suppose, to dried-fruit beetles. The nearest known source from which these insects may have come was a citrus dump nearly 3 miles east. Of the estimated 47,900 beetles liberated, 274, or 0.57 percent, were recovered. The traps west of the point of liberation took the fewest number of stained beetles. (The prevailing wind direction is northwest.) One trap 1,260 feet east of the central point captured 144 stained beetles during the first 24 hours.

Fluorine injury to peaches in Georgia.--Oliver I. Snapp and J. R. Thomson, of the peach-insect laboratory at Fort Valley, Ga., have made a full report on the injury caused by fluorine compounds used experimentally in the control of the plum curculio. Although large numbers of peaches that dropped had been injured by the insecticides used, a sufficient number remained on the trees so that the injury was not reflected in the number of peaches harvested. The fruit remaining on the trees treated with fluorine compounds averaged smaller in size, however, and also showed evidence of considerable spray injury, the percentages being as follows:

Material	Applications	Harvested fruit injured by spray
	Number	Percent
Barium fluosilicate, 2 lbs. in 100 gals--------------	4	24.1
Barium fluosilicate, 3 - 100-	3	13.3
Synthetic cryolite, 2 - 100--	4	21.3
Natural cryolite, 2 - 100----	4	27.8
Natural cryolite, 3 - 100----	3	10.2

The foliage was uninjured by the above treatments. The results of the experiments this year warrant the conclusion that a full schedule of applications of barium fluosilicate or of synthetic or natural cryolite cannot be used on peaches in the South on account of the danger of serious injury to fruit. The amount of residue on the fruit has not yet been determined.

MEXICAN FRUIT FLY CONTROL

Fruit fly trapping in lower Rio Grande Valley.--One adult Anastrepha ludens Loew was trapped in the Mission district on September 9. This is the first adult of this species taken in the valley since May 22. There were 8,889 traps in operation in Texas during September. These traps were examined 28,769 times, and in addition to the one specimen of A. ludens, 2 A. serpentina Wied., 4 A. fraterculus auct., and 28 A. pallens Coq. were trapped. One A. fraterculus was trapped in Matamoros and 117 A. ludens and 249 larvae of Anastrepha sp. not ludens were taken from market fruit in Matamoros and Reynosa.

DATE SCALE CONTROL

No scale found in September.--Ground inspection was completed in the Indio district during the month and most of the plantings were dropped from the inspection lists as being free from scale. A total of 2,780 palms were inspected and no scale was found. This completes systematic inspection by districts in the Coachella Valley. Inspection of individual plantings still under suspicion because of location, physical condition, or past history will be continued. In the Imperial Valley inspection was continued in the areas surrounding the most recent infestations and a survey to locate any Canary Island palms that may have been overlooked was begun. During the month 637 date palms and 425 Canary Island palms were inspected and no scale was found.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Colonization of European corn borer parasites.--W. A. Baker, Toledo, Ohio, reports that the distribution of parasites of the European corn borer in 1935 procured from importations of hibernating larvae from Europe and the Orient, are as follows:

State	Lydella stabulans var. grisescens	Inareolata punctoria	Cremastus flavo-orbitalis	Bracon atri-cornis	Total
	Number	Number	Number	Number	Number
Maine----------	1,927	--	--	--	1,927
New Hampshire--	5,569	--	--	--	5,569
Vermont--------	9,813	--	--	--	9,813
Massachusetts--	7,824	--	--	--	7,824
Connecticut----	1,823	1,138	771	7	3,739
New York-------	11,767	1,712	600	--	14,079
New Jersey-----	6,461	565	593	--	7,619
Virginia-------	3,956	--	600	--	4,556
Michigan-------	5,980	--	--	--	5,980
Ohio-----------	25,898	3,888	--	--	29,786
Indiana--------	11,904	--	--	--	11,904
Total---------	92,922	7,303	2,564	7	102,796

These parasites were obtained from 1,112,925 larvae collected on the west coast of Italy by this Bureau, the collections being made under the direction of H. L. Parker, of the Foreign Parasite Introduction Division, and from 34,592 larvae collected on Kyushu Island, Japan, through the cooperation of the Entomological Branch of Canada. The total mortality, from the time of collection of the parasites in the emergence chambers until their release at the liberation points, was less than 2 percent. The primary objective of the colonization program this season was to procure and release Inareolata punctoria Roman, all other species obtained from Europe being incidental to this. Releases were made in localities not colonized prior to this year, thus extending the colonized area into regions more lightly infested by the corn borer. I. punctoria and Lydella stabulans var. grisescens R. D., particularly the latter, have been well distributed throughout the more important areas of current concentration of corn borer infestations. The species not thoroughly tested to date--Cremastus flavoorbitalis (Cameron) and Bracon atricornis Smith--were released at established test points where they have not been liberated before, in order to obtain their reaction to different environments. All three of the species given prominence in the 1935 program--I. punctoria and L. stabulans var. grisescens from Europe and C. flavoorbitalis from the Orient--are being tested in two new environments in the infested regions in New Jersey and Virginia.

Trap-crop method impractical for chinch bug control.--C. M. Packard, La Fayette, Ind., reports as follows: "The spring and early summer seasons of 1934 and 1935, during which data were collected concerning the relative attractiveness of the various small grains to chinch bugs, offer about as wide extremes of weather conditions as are ever likely to occur during years of chinch bug abundance. Although it would be desirable to have similar data taken in a more normal season, for comparison, it seems likely that such data would fall between the extremes already observed. However, the data already obtained throw considerable light on the practicability of some of the questionable methods of chinch bug control suggested from time to time. One of these is the use of small grains, especially barley and spring wheat, as concentration or trap crops. As would be expected, the studies here reported show decisively that the food preferences of chinch bugs migrating from winter quarters vary with the climatic character of the spring season. In 1934 winter wheat and rye were the most commonly preferred crops but in 1935 barley and spring wheat were on the whole the most commonly preferred, although winter wheat and rye, especially the latter, were again heavily infested. Oats were least preferred but contained some spotted heavy infestations in both years, for one reason or another, even in areas where the preferred grains were present. In short, no one of the commonly planted small grains was preferred sufficiently to be a very dependable trap or concentration crop. The main weaknesses of the concentration, or trap crop, idea observed in the course of this work were: (1) The difficulty of obtaining adequate concentration of the bugs on account of their variable preferences for different grains under different weather and growth conditions; (2) the trap-crop acreage necessary would probably approach the acreage and number of fields of the more attractive grains customarily planted; (3) the difficulty of disposing of the infestation after concentration, owing in some instances to interfield migration of gravid adults when the favored crops no longer suited them; (4) the ability of adults to migrate from infested grain when it is destroyed by any known method of cultivation; (5) the necessity of using barriers, or timing the destruction of the trap crop by cultural methods so that the bulk of the first brood has hatched but still has not attained enough size to migrate readily on foot; (6) the tendency of the farmer to omit or slight the thorough cultural operations, or use of barriers, necessary for effective destruction of the concentrated bugs; (7) the gain through control of bugs by trap-cropping offset by loss of productive acreage and expense of planting and destroying the crop; and (8) limitation to other than graminaceous crops for replanting of trap-crop areas. On the other hand, under the drought conditions of 1934 many winter wheat and rye fields were utilized quite effectively as trap crops, although they were not originally planted for this purpose. Many cases were observed that year where severe infestation of corn was prevented by thoroughly plowing under and harrowing adjacent heavily infested winter wheat or rye fields at the right time to destroy the first-brood nymphs before they could migrate to the corn. In some instances, however, it was necessary to supplement the cultural operations by the use of creosote barriers."

Weedy alfalfa induces injury by pentatomid bugs.--O. L. Barnes, Tempe, Ariz., reports: "It is known that at least four species of stink bugs damage alfalfa seed in southern Arizona and adjacent areas. Three of the species were found in each area surveyed, and two species, Chlorochroa sayi Stal and Thyanta custator Fab., were rather widely distributed in alfalfa fields in each area. Seed damaged by pentatomid feeding punctures ranged from a trace to 44.4 percent in Arizona alfalfa fields in 1935. It was noticed early in the season that stink bugs were most numerous in fields with intermixed stands of alfalfa and wild host plants of the bugs or in fields with borders, ditch banks, or waste areas nearly grown up in wild hosts of the insects.

Almost without exception these weedy fields yielded the largest percentages of seed ruined by stink bug punctures, and generally the damage was higher where the weeds grew among the alfalfa plants. In three seed-growing areas the cleaner fields were those in which the seeds were injured least by pentatomids."

Two generations of Melanoplus mexicanus Sauss. in Salt River Valley, Ariz.--V. L. Wildermuth and E. G. Davis, Tempe, report that in the Salt River Valley M. mexicanus gave a second hatch of grasshoppers the middle of July. Many fields showed a high population count. The outbreak was controlled readily, however, by the use of poisoned-bran mash. One field southeast of Tempe was not poisoned, and in this field continuous observations have been made for the past 3 months. We were especially anxious to ascertain the time, place, and egg-laying habits of the mature females. On September 25 many hoppers were noted ovipositing. They were placing their eggs mostly on the raised borders in the field, rather than in the level areas between. The field contained a good stand of alfalfa and had only a few days previously been disked to barley. The ground was moist and pliable as a result of these cultural operations, and during the evening of the previous day, about 0.1 inch of rain fell in the locality. The temperature during the time of observation, from 10 to 11 a.m., was 80° F. In addition to the hoppers noted ovipositing, many showed distended abdomens. It is interesting to note that all stages of hoppers were present in the field, from newly hatched first-instar nymphs to mature adults. About 80 percent of the hoppers were mature. It is hoped from these observations that we will have less trouble in locating eggs during our fall survey this year than was the case in the past survey.

Cage experiments with grasshoppers in Arizona.--Messrs. Wildermuth and Davis also state: "Our large field cage in the laboratory plots, which had been stocked with first-generation hoppers on May 6 for the purpose of determining the time of a second generation, produced rather large numbers of newly hatched nymphs on July 15. As great care has been exercised in placing this cage where no eggs could have been deposited the previous year, we are certain that these hoppers hatched from eggs laid during the first half of May, being approximately 70 days in the egg stage. This cage checks very closely with the results obtained in the cage last year. The hoppers hatching on July 15 grew and developed rapidly and on September 5 the first adults of the second generation were noticed. This was 52 days for the nymphal stage."

Correction.--In the News Letter dated October 1, 1935 (Vol. 2, No. 10) last paragraph on page 3, the sentence beginning, "The lodged grain afforded---", should read, "This volunteer wheat afforded----."

JAPANESE AND ASIATIC BEETLE INVESTIGATIONS

Soil population of Japanese beetle in September.--From larval surveys conducted by I. M. Hawley and S. R. Dutky, Moorestown, N. J., in the roughs of five golf courses in the older infested area the following data have been obtained on the various stages of the Japanese beetle present during September 1935.

Date	Overwintering brood:	New brood			
		Egg	Larvae		
	Adult		1st-instar	2nd-instar	3rd-instar
	Percent	Percent	Percent	Percent	Percent
Sept. 1-10	(1)	(1)	(1)	(1)	(1)
11-20	0	0.2	3.9	58.9	37.0
21-30	0	0.0	2.5	44.4	53.1

[1] Records incomplete because of rainy weather.

The retarded development evident during the past spring and which was shown in the late emergence of beetles, was still reflected in the soil population of the new brood at the close of September. The percentage of larvae in the third instar was much lower than normal for this period. The diseased larvae in the soil population at 5 stations in September 1935 were as follows:

Station	Diseased larvae		
	Sept. 11-12	Sept. 18-19	Sept. 25-26
	Percent	Percent	Percent
Merchantville, N. J	3.5	4.5	10.7
Haddonfield, N. J	27.5	11.5	34.6
Jenkintown, Pa	5.9	11.3	6.1
Rydal, Pa	7.5	9.8	8.0
Philmont, Pa	3.3	1.8	7.8
Average for all larvae collected	5.3	5.5	10.3

Nearly all of the diseased larvae were of the milky type. All larvae found in surveys were brought to the laboratory and were reexamined for disease symptoms. The percentages given are, therefore, based on both field and laboratory examinations. During the month over 4,000 larvae collected from the sod treatment plots at the Moorestown laboratory in surveys made by the Control Division were examined and it was determined that 55, or 1.4 percent, showed the milky disease. This agrees with the figures for disease at the Moorestown golf course and Lippincott's pasture for September 1934.

Studies on fungus disease and the effect of soil moisture on the degree of parasitization by a fungus.--Preliminary soil inoculation experiments carried on by S. R. Dutky, Moorestown, to determine the effect of moisture on the degree of parasitization by fungi indicate that it is favored by low soil moisture and that the critical moisture value is associated with the maximum moisture at which soil particles will still adhere to the cuticula of the larvae. The fungi used were cultured from field-collected dead fungused larvae and the characteristics agree very closely with those of Meterrhizium anisopliae.

Diseases of Japanese beetle larvae.--The diseases of the larvae of the Japanese beetle encountered in a preliminary study by G. F. White, Moorestown, during the fall of 1933 are classified in a paper in press (by I. M. Hawley and R. T. White) in three groups--black group, white group, and fungus group.

Reference is made also to a nematode disease of the larvae.

Effectiveness of standard trap and modifications of standard trap in scouting for adult Japanese beetle.--During the month a report by F. W. Metzger, Moorestown, covering this work has been prepared. One hundred traps of three different types were operated at Cape Charles, Va., and Salisbury, Md., and 48 of each type at Pocomoke City, Md., during the summer of 1935 to determine the relative effectiveness of the various types which were as follows: Standard cylindrical type painted green and white; standard cylindrical type painted aluminum; and the newly developed scouting trap made of lacquered tin. In capturing the Japanese beetle the green-and-white trap is approximately twice as effective as the aluminum-painted trap or the scouting trap. The difference between the latter types is not appreciable. While the green-and-white trap is more effective in catching beetles, the decision as to what type to employ for scouting purposes cannot be determined without a careful consideration of the costs of shipping, operation, and maintenance, all of these being factors beyond the scope of this report.

Stomach poisons and repellents for adult Japanese beetle.--Tests conducted by W. E. Fleming and F. E. Baker, Moorestown, were made under controlled conditions of temperature, relative humidity, and light, and the value of the materials as stomach poisons and repellents compared with acid lead arsenate, which was tested at the same time and used as a standard insecticide. Aniline fluosilicate, di-methyl-dihydro-stearamide, diphenylamino, diphenylol propane, hexachlorobenzene, lauryl alcohol, and stearyl alcohol were not effective as stomach poisons. When the foliage of smartweed was not injured by these materials the beetles fed extensively, but when the foliage was injured by the chemicals it was largely unpalatable to them. An investigation was made of several organic sulphur compounds as insecticides against the Japanese beetle. When used at the rate of 8 pounds to 100 gallons of water, 5-chloro-1-amino-benzothiazole appeared to be equally as effective in killing beetles as lead arsenate used at this rate. Increasing the concentration of this material to 32 pounds did not significantly increase the insecticidal action but it decreased the extent of feeding. Mercapto-benzothiazole at the rate of 8 pounds to 100 gallons of water was about one-fourth as effective as lead arsenate and afforded little protection to the foliage. Higher concentrations of this material severely damaged foliage and 2-mercapto-6-ethoxy-benzothiazole was of no value as a stomach poison. When used at a concentration of 8 pounds to 100 gallons of water, tri-thioformaldehyde, 1-2 mercapto-naphthiazole, thio-beta-naphthol, n-octyl-p-toluene-sulphonamide, cetyl-thiocyanate, stearyl thiocyanate, thio-p-toluodine, and di-phenyl thiourea were of practically no value as repellents or stomach poisons. Tetra ethyl thiuram monosulphide, tetra methyl thiuram monosulphide, tetra methyl thiuram disulphide, and dipiperidinium thiuram tetrasulphide were of little value as stomach-poison insecticides but appear to be positive repellents against the Japanese beetle. Some feeding occurred on plants sprayed with tetra ethyl thiuram monosulphide and dipiperidinium thiuram tetrasulphide at a concentration of 8 pounds to 100 gallons of water, but practically no feeding occurred on plants sprayed with tetra methyl thiuram monosulphide or tetra methyl thiuram disulphide at this concentration. It was found that washing sprayed foliage with water modified only slightly the repellency of these methyl compounds. Tetra methyl thiuram monosulphide and tetra methyl thiuram disulphide appear to possess all of the favorable properties of derris as a repellent against this insect and in addition have the advantage of being definite synthetic materials apparently resistant to washing from foliage by rain and to rapid decomposition in sunlight. The thiuram compounds should be extensively tested in the field during the coming season as repellents against the Japanese beetle.

Development of stomach poisons for control of Japanese beetle larvae.--During the spring of 1935 a study was made by Messrs. Fleming and Baker of the effectiveness of lead arsenate in killing larvae of the Japanese beetle in different soils, which may be classified according to geologic origin, mode of formation, and topographic position as glacial soils, Appalachian Mountain soils, limestone valley soils, Piedmont Plateau soils, and coastal plain soils. It was found that the speed of insecticidal action, as compared with the action in sassafras sandy loam, varied from about one-third in the Colt's Neck loam to about two times in Lakewood sand. The total plant food in the soil appeared to have little effect on the insecticidal action. It was found that 82 percent of the variance in the insecticidal action could be attributed to the variation in the water-soluble plant food in the soils. The variation in the concentration of water-soluble phosphates in the soil appeared to account for 73 percent of the modification in the insecticidal action and may be considered as the most important modifying factor in the soil. Ammonia accounted for 2.4 percent and magnesia for 5.9 percent of the variance. The pH of the soil, and the water-soluble manganese, calcium, potash, chlorides, and nitrates appeared to have no influence on the insecticidal action. There was a high correlation between the amount of phosphate, sulphate, carbonate, ammonia, potash, and soda radicals introduced into sassafras sandy loam and the concentration of water-soluble arsenic in the soil. There appeared to be no correlation between the amount of chloride, nitrate, calcium, and magnesia radicals introduced and the soluble arsenic. It is evident that the introduction of phosphates, carbonates, ammonia, potash, and soda radicals increased the water-soluble arsenic, and the sulphate radical decreased the water-soluble arsenic in the soil. There appears to be a correlation between the effectiveness of acid lead arsenate as an insecticide and the formation of water-soluble arsenic in the soil. This relationship is being further investigated and will be reported later.

Effect of paradichlorobenzene on Japanese beetle eggs.--In a test, by J. W. Lipp, Moorestown, beetles were placed in tower cages over pots of soil and were allowed to oviposit. This soil containing eggs was then mixed with paradichlorobenzene at rates of 2 and 5 pounds per cubic yard. At the end of 7, 14, and 16 days results were as follows:

Treatment	7 days		14 days		16 days	
	Eggs	Grubs	Eggs	Grubs	Eggs	Grubs
Untreated	268	0	382	5	16	41
2 lbs. paradichlorobenzene per cubic yard	75	0	88	0	34	5
5 lbs. paradichlorobenzene per cubic yard	17	0	38	0	6	0

These tests were not run simultaneously, the 14-day test being run last, at a time when the weather was distinctly cooler, which may account for the small number of grubs found in the untreated soil. A careful examination of the eggs in the treated soil (particularly in the higher dosage) showed many of them to be brown and not entirely firm, in contrast to the characteristic appearance of normal eggs. Although paradichlorobenzene was formerly thought to kill the newly hatched larvae without having any action on the eggs, these observations indicated some evidence of egg injury. It is apparent that with the lighter dosage the concentration was not sufficient to prevent some eggs from hatching or to kill young larvae 16 days after the treatment was applied.

Studies of Tiphia popilliavora, a parasite of the Japanese beetle.--T. R. Gardner, Moorestown, reports that emergence of T. popilliavora (Korean strain) adults from cocoons propagated in the fall of 1934 and stored in the temperature-control chambers began on August 19 and continued through September 16, with the peak of emergence occurring shortly after the first of September. A total of 5,300 adults emerged, giving an emergence percentage of 54.4. Of these, 56.4 percent were males and 43.6 percent were females. Nine colonies, each consisting of 200 laboratory-mated females, were placed in the field. Five of these colonies were placed in areas in New Jersey that were heavily infested with grubs and 4 were placed in Pennsylvania. One of the releases in Pennsylvania was placed on the Baederwood golf course, where the Koiwai strain of T. popilliavora is well established, to determine the future effect when these two strains are blended under field conditions. The remaining females were mated and are now being used in laboratory propagation work to obtain material for colonization in 1936. On September 11 and 16, respectively, adult females of this species of parasite were observed at the Paxon Hollow golf course in Pennsylvania and the Woodcrest golf course in New Jersey. These two colonies were placed in the field in the fall of 1934.

JAPANESE BEETLE CONTROL

Japanese beetle quarantine activities.--Classification records were readjusted to conform to the results of the season's scouting. Nurseries and greenhouses that previously had been newly classified and assigned the status of an infested establishment, pending an opportunity for an examination of the premises during the period of adult flight, and which were found uninfested this summer, have been accorded the privilege of shipping their plant material without actual inspection or treatment. Other establishments found infested for the first time will be obliged to conform to the stricter requirements of the regulations when their fall shipping season begins. About a dozen establishments, many of them on Long Island, on which a few beetles were found and located in recently and scantily infested sections, have been subdivided and reclassified with portions of each establishment in both classifications.

Lifting of restrictions on fruits and vegetables releases temporary employees.--With the revocation on and after September 18 of the seasonal Japanese beetle quarantine regulations on the movement of fruits and vegetables, the temporary force of 80 men engaged in farm-products inspection was dismissed. Although scattered beetles were still to be found in the generally infested area, they were not in flight and had not been found infesting farm products for some time prior to the lifting of the regulations. As beetles were still to be found in blooms of outdoor-grown flowers, the restrictions on the movement of cut flowers will be continued in effect until the maximum date, October 15.

Japanese beetle certification increasing.--A number of nurseries in the heavily infested area have begun to take on employees for their fall business. Certification of rose bushes has picked up and all phases of the certification work are on the increase. Cool weather resulted in a scarcity of adult Japanese beetles. Sand and gravel shippers in New Jersey were quite active, with numerous calls for fumigation of carload shipments of these materials. Strawberry-plant shippers on the Eastern Shore of Maryland steadily increased their demands for certification.

Japanese beetle trapping concluded for season.--Trapping for the Japanese beetle during 1935 was completed on September 20, when the traps in Augusta, Maine, were lifted and packed for storage. The traps in the 18 trapped communities in Maine were the last to be removed in the season's trapping program.

Air shipments inspected.--At the opening of a new airport at Allentown, Pa., an inspector from the Philadelphia office was kept busy inspecting and certifying shipments of cut flowers destined to California as "good will" tokens.

Survey of dead and dying elms begun as yellowing of foliage halts systematic scouting.--The last week in September marked a transitional stage from systematic scouting for Dutch elm disease infection to surveys for the purpose of locating dead and dying elms in connection with the winter's sanitation campaign. With few exceptions, systematic scouting in the major infected zone was concluded on September 15, when drastic reductions were made in the scouting force. Most of the men retained were assigned to locating and marking dead and dying elm trees. Later they will be transferred to eradication or sanitation crews. A limited amount of systematic scouting was performed in New Jersey areas that had not been previously reached because of extensions of infected areas. Personnel on work-relief funds was reduced from a maximum of 3,824 to approximately 2,200 men.

Dutch elm diseased trees found at Portsmouth, Va., and Brunswick, Md.--During the month samples were collected from trees at Portsmouth, Va., and Brunswick, Md. These were later confirmed as infected with the Dutch elm disease. The infected tree at Portsmouth is in the same general region as the Norfolk infections. A supervisor who was scouting railroad rights of way out of Baltimore located the Brunswick tree. Brunswick is approximately 50 miles from Baltimore. It is a center for freight reloading and is one of the transfer points through which imported burl elm logs passed en route to veneer mills. The Brunswick tree is the only new isolated infection center found during the current year's scouting activities. In the major diseased area the finding of a confirmed tree near the town of Craigville, Orange

County, N. Y., resulted in a slight increase in the infected zone in that State.

Progress of W. P. A. work in European corn borer scouting and survey.--European corn borer scouting and survey activities were under way by the end of the month in the New England States, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, Ohio, Indiana, Illinois, Michigan, and Wisconsin. As this work was not started until so late in the season, it is not probable that there will be an opportunity for organizing the scouting in West Virginia and Kentucky, as originally scheduled. Numerous first-record infestations were reported from heretofore uninfested townships in New Jersey, Michigan, and Wisconsin. By the end of the month the survey work in New England was nearing completion.

Clean cutting progresses in New Jersey swamp.--Clean cutting work in the Great Piece Meadows of Essex County, N. J., is progressing rapidly. Additional equipment and personnel accounted for a much greater production in this section. By September 28 the clean cutting had resulted in the destruction of 8,245 elms. Of this number, 234, or 2.8 percent, were confirmed by the laboratory as Graphium-diseased. The camp in this area has been moved to a different location to enable the men to work new power equipment in a heavier elm population.

Infested products certified after removal of egg clusters.--In the course of inspecting a car of birch fireplace logs, three inspectors working at Meredith, N. H., on September 24 found 80 new egg clusters and approximately 1,500 old ones. There were 17 cords of wood in the shipment. The cordwood had been cut in the woods around Meredith Neck and had been stored for some time in the presence of a heavy gypsy moth infestation. At Nobleboro, Maine, 3 egg clusters were removed from a carload of lumber consigned to Eastport, Maine. At Wescott, Maine, 12 egg clusters were found on 5 carloads of lumber consigned to Brooklyn, N. Y. At Deering Junction, Maine, 1 egg cluster was found on lumber consigned to South Camden, N. J. While inspecting a carload of lumber at Bridgewater, N. H., for transportation to Quebec, Canada, the district inspector destroyed 3 egg clusters. At Warner, N. H., 20 egg clusters were found on 2 truckloads of lumber consigned to Garden City, Long Island. Four shipments of birch-log firebrand containers inspected at Conway, N. H., for shipment to nonregulated territory in Connecticut were found to contain 14 egg clusters.

Mice rid lumber of gypsy moth infestation.--While inspecting 60,000 board feet of lumber in the South Portland, Maine, district, the inspector noted many empty female pupae cases on the boards, but could locate comparatively few female moths or egg masses on the lumber. There were several freshly deposited egg clusters and female moths on nearby trees. Almost every pile of lumber examined had one or more nests of mice in it. Apparently the mice had eaten the female moths as fast as they emerged from the pupal cases, thus preventing them from depositing their eggs. Moths of nearby trees were undisturbed.

Pine trees infested with gypsy moth and infected with white-pine blister-rust intercepted.--Prompt action by a district inspector in halting a passing west-bound motorist with evergreens tied on the rear of his car, prevented the movement from Laconia, N. H., to Media, Pa., of 5 small white pine trees. On 1 white pine tree were found two new gypsy moth egg clusters. All trees were found to be infected with the white pine blister rust.

FOREST INSECT INVESTIGATIONS

Feeding by adult native elm bark beetle.--H. A. Crandell, of the Morristown, N. J., laboratory, has previously reported that when adults of the native elm bark beetle (Hylurgopinus rufipes Eich.) were confined with small healthy elm trees in cloth cages they fed on the twigs and trunks. Referring further to these experiments and to others where elm logs suitable for oviposition or feeding purposes were placed in cages with the trees, Mr. Crandell states that feeding was heavy in both series of experiments. It was confined chiefly to the main stems or trunks, particularly to places covered with rough or fissured bark. The depth to which the beetles penetrated the bark varied, but in most cases the inner bark or cambium was reached and in many instances the feeding injuries extended to the wood. No brood galleries were formed, although the attacks on the trunks may have been for that purpose, but conditions were unfavorable to the beetles. Feeding in the crotches of twigs was rather common. In several instances the beetles had fed on the bark of the twigs of this year's growth, leaving comparatively large areas of exposed wood. Most of the feeding scars were indistinguishable from those typical of the small European bark beetle (Scolytus multistriatus Marsh.).

Dutch elm disease vector work in England.--D. E. Parker, formerly stationed at the Morristown, N. J., laboratory, reached England on July 18. He has been detailed to study the insect vectors of the Dutch elm disease in that country, cooperating with J. M. Walter, of the Bureau of Plant Industry, who has been assigned to investigate the disease there. Mr. Parker reports that in England he finds the large European bark beetle (Scolytus scolytus Fab.), which is not known to be present in the United States, much more vigorous than the small European bark beetle (S. multistriatus), a species now well established in the northeastern part of the United States. He saw one dead elm tree this year that was being riddled by S. scolytus, even to the exposed portions of the roots. In the other trees, 200 years or more of age, with trunks up to 4 and 5 feet in diameter and with very roughened, deeply fissured bark on their trunks, the frass expelled by the beetles covered the ground from 5 to 6 inches from the bases of the trees.

Bark beetles breed readily in treated stumps.--A. F. Verrall, of the Bureau of Plant Industry, has found that the application of powdered copper sulphate to the stumps of elms infected with Dutch elm disease gives satisfactory results in preventing sprouting. R. R. Whitten, of the Morristown, N. J., laboratory, has been making observations on stumps so treated to determine whether or not they are attacked by bark beetles. He finds that the treatment appears to cause the stumps to dry much more rapidly than untreated stumps and thus become favorable for attack by the bark beetles S. multistriatus and H. rufipes and for the development of their larvae much sooner than stumps not so treated. Mr. Whitten is now carrying on tests for the purpose of finding some substance that will prevent such attack and that may be used to supplement the copper sulphate treatment.

Spruce sawfly experiments at New Haven.--H. J. MacAloney reports that preliminary experiments in the laboratory indicate that the larvae of the European spruce sawfly (Diprion polytomum) will feed on the Colorado blue spruce. All three native spruces and the Norway spruce are attacked. No parasites have thus far been observed but a predatory pentatomid, Podisus maculiventris Say, gives promise of being an important control factor. This predator has been found in several places in New England. It attacks the larvae of the sawfly, especially the later stages, and sucks them dry.

Beech scale study.--W. L. Baker, of the Melrose Highlands, Mass., laboratory, spent the period September 4 to 11 in Maine, examining the beech scale permanent sample plots. Dr. Grant and Mr. Childs, of the Division of Forest Pathology, New Haven, Conn., visited the plots at the same time. Mr. Baker reports: " Data were obtained on the degree of scale infestation on the numbered trees and the condition of these trees. Generally speaking, the scale infestation was heavier than in 1934. The following table gives comparable data for the seasons of 1934 and 1935.

Scale classification group	Trees in all plots in each scale classification group	
	1934	1935
	Percent	Percent
Not infested	41.9	29.1
Trace of infestation	17.8	27.5
L1	35.2	18.5
L2	4.5	15.1
L3	0.6	7.8
L4	0.0	1.5
L5	0.0	0.0

The above table shows a decrease in the proportion of scale-free trees in 1935 and an increase in the proportion of trees from medium to heavily infested. Many trees infested only at the base in 1934 showed a pronounced infestation in 1935 up to heights of 8 and 10 feet. On the whole, no marked change was noted in the condition of the trees. A rough survey made by Mr. MacAloney, J. V. Schaffner, and S. F. Potts, of beech stands in Warren, Essex, Hamilton, and Franklin Counties in New York and in areas in southern Vermont and northwestern Massachusetts, failed to reveal the beech scale in these districts. An examination of the beech scale infestations in Westchester County, N. Y., showed no appreciable increase of this insect there in 1935. Chilocorus bivulnerus Muls., a predacious coccinellid on the scale, was abundant in the Scarsdale, N. Y., infestation."

Wireworm damages black locust seedlings.--During a nursery-inspection trip throughout the Central States in September, R. C. Hall, of the Columbus, Ohio, laboratory, observed two instances of wireworm injury to black locust seedlings in nurseries. One nursery was located at Benton, Ky., and the other at Conway, Ark. The seedlings were killed by the wireworm larvae boring holes completely through the roots at distances ranging from 1/4 inch to 3 inches below the ground surface. The damage appeared to be confined to more or less local areas within the nurseries where the soil was quite heavy, with a good moisture supply. In some beds there were patches of several square feet where practically all the seedlings had been killed by this insect. The damage was estimated as about 5 percent in the Conway nursery and about 10 percent in the Benton nursery.

Prionus sp., a pest in hardwood nursery.--N. D. Wygant, working on shelter-belt insects from the Denver, Colo., laboratory, found a species of Prionus killing quite a few green ash (Caragana) and honeylocust seedlings in the Plains Shelterbelt Nursery at Pierre, S. Dak., during a trip through South Dakota early in September. Generally, the main roots of the seedlings, averaging the size of a lead pencil by September 15, were completely devoured by the large larvae from within 1 or 2 inches of the ground surface to an occasional depth of 14 inches. The larvae, almost 1/3 inch in diameter at the thickest part and ranging from 1-1/2 to 2 inches long, leave a conspicuous oval-shaped open tunnel. All that remained of the main roots on the dead seedlings were a few fragments of bark and a small quantity of coarse fibers in the tunnels. The tunnels follow the roots, occasionally detouring around a section of the root to return at a greater depth. These larvae had killed 10 percent of the hardwood seedlings in a 3- or 4-acre area and had done some damage in all parts of the nursery. The present nursery site was covered with a shrubby growth--cherry, cottonwood, and ash being the principal species--until last winter, when the land was cleared and broken for the hardwood nursery.

Tylonotus bimaculatus Hald. common in Nebraska and South Dakota.--Mr. Wygant also reports that T. bimaculatus is quite common and abundant in the old green ash tree claims and farmstead plantings from 40 to 50 years old in central Nebraska and South Dakota. The trees attacked by this insect die branch by branch, starting at the top. The heaviest attack appears to be at the base of the tree near the ground line. The young larvae feed in the bark and as they become larger they penetrate the sapwood to a short depth. Upon emerging, the adult beetle makes an oval hole to the surface. These holes are the most conspicuous signs of attack on such slowly growing trees. The attacks generally occur in patches on the trees, the area of the patches increasing with each year's new attack. Both T. bimaculatus and the carpenter worm (Prionoxystus robiniae Peck) are commonly found working in the same tree.

Tree midge injurious to ponderosa pine.--J. C. Evenden, of the Coeur d'Alene, Idaho, laboratory, reports that an unidentified tree midge is killing a large percentage of ponderosa pine tips in northern Idaho. The adult midge deposits her eggs at the bases of needle fascicles by forcing them into the soft tissue of the current season's growth and, upon hatching, the larvae excavate small pits in which they feed. As many as 35 midge larvae were found in a 4-inch lateral tip. Usually only 1 larva was found at the base of each fascicle, but sometimes 2 or 3 were present in one pit. As a result of this feeding, the needles on an infested tip fade, the tip dies and appears as a faded, red tip during the season following attack. The infestation assumed serious proportions during the 1935 season, when the tips attacked in 1934 began to show red foliage, and it was ascertained that in some areas as high as 40 percent of the tips were infested.

PLANT DISEASE CONTROL

Barberry eradication employs over 2,000 men.--On October 1, 2,047 men were employed in barberry eradication in 17 States. Of this number, approximately 93 percent had been obtained from relief rolls. The field work is supervised by 133 trained agents under appointment with the Bureau.

W. P. A. program for barberry eradication.--Of the 159 men now employed with W. P. A. funds in Iowa, 146 have been taken from relief rolls, 9 are under appointment as agents, and 4 are from nonrelief sources hired on the security wage basis. At present there is an experienced supervisor with each crew of 9 or 10 men. The work is being conducted in 12 counties and it is planned to add about 25 more men during the months of October and November. E. A. Lundgren, in charge of the work in Colorado, reports that 85 certified relief laborers are now employed in connection with the barberry-eradication program in that State and 5 appointed agents are supervising the work. A complete survey, covering all suspected barberry territory, is being conducted in Pueblo, Fremont, Rio Grande, Morgan, and La Plata Counties. In Rio Grande and La Plata Counties most of the bushes eradicated are Berberis fendleri, a species native to southwestern Colorado and extremely susceptible to attack by stem rust. Survey activities in South Dakota have been restricted to eastern and southeastern counties. George W. Eade reports that only scattered bushes have been located so far but many questionable areas of timberland along rivers and streams have been given a careful inspection. There are 33 men, divided into 3 crews, at work in South Dakota.

Physiologic-form survey.--Nine hundred and thirty-five collections of stem rust have been identified as to the physiologic forms present. One hundred and seventeen of these collections were from barberry bushes and comprised 21 physiologic forms, or a different form for every 6 collections, and 818 were from grains and grasses, comprising 18 different forms, or one in every 45 collections. Forms 56 and 11 continued to lead in prevalence, with forms 34 and 36 next. The total numbers of identifications of each of the 9 most common forms isolated to date are as follows:

Form No.	Times identified	Form No.	Times identified
	Number		Number
56	362	19	22
11	178	38	21
34	104	17	11
36	57	21	11
49	25		

Form 56 is proving to be by far the most prevalent, both in collections from barberry and from grains and grasses.

Progress of blister rust control in the Northeast.--Blister rust control work in the Northeastern States during the period May to August 1935 resulted in the eradication of 16,577,069 Ribes bushes from 683,402 acres. This work required 222,568 man-days of labor, which was performed under five programs--regular cooperative, E. C. W., E. R. A., P. W. A., and W. P. A. During August over 6,000 men were employed on the various control projects. The W. P. A. program in August gave employment to an average of 2,379 men for 31,502 man-days in 185 townships. The number of such workers in September was increased to over 3,000 in the nine States in this region.

Blister rust W. P. A. crews developing satisfactorily.--T. J. King, district leader in New Hampshire, reported on September 14 that he had 11 W. P. A. crews at work. The men, both old and young, with comparatively few exceptions, have developed quite satisfactorily. Their spirit is good and they are anxious to have the work continue as long as possible. Checking records show that for the most part they are doing thorough Ribes-eradication work, although these crews are slower than our regular crews. Skunk currants are becoming more generally defoliated but there are still a sufficient number and distribution of leaves to enable the crews to locate them, and the wild gooseberry foliage is still in good condition.

Five C. C. C. workers eradicate 17,000 Ribes in 1 day.--A crew of 5 men from the 121st Company, C. C. C., West Burke, Vt., working from a side camp located near the village of Lower Waterford, made what is believed to be a record in eradicating Ribes. In 1 working day of 7 hours they located and destroyed 17,000 Ribes on an area of 8 acres in the town of Waterford, Caledonia County. The total number of Ribes destroyed that day with the entire force of 25 C. C. C. workers was 25,000 and the total area worked was 35 acres. Prior to this year these men had had no experience in such work.

White pine blister rust found in Illinois and Indiana.--Blister rust was found this season in Illinois and Indiana, thus bringing the number of infested States to 23. No trace of the disease had ever been discovered in Illinois before, and the only case in Indiana was one of an introduced infected pine which was found and destroyed 18 years ago and from which blister rust never spread. On a survey undertaken this fall by the Division of Domestic Plant Quarantines and the Division of Plant Disease Control, J. M. Corliss on September 14 found two infected Ribes nigrum bushes at Warren, in Jo Daviess County, Ill., and R. A. Sheals and F. F. Franklin on September 27 located the rust in LaPorte County, Ind., on R. cynosbati. Specimens of infected leaves from these bushes were forwarded for examination to the Division of Forest Pathology, Bureau of Plant Industry, and specialists of that Division reported on October 7 that by spore measurements and a staining test the rust had been identified as white pine blister rust, caused by Cronartium ribicola. Specimens were also obtained in an additional county, but the identification has not yet been confirmed.

W. P. A. blister rust control work.--On October 5, 9,257 W. P. A. workers were employed on blister rust control work throughout the United States. Of this number 8,745 were relief workers and 512 were nonrelief employees.

COTTON INSECT INVESTIGATIONS

Good gains from cotton flea hopper control.--Incomplete records from acre plats and large-scale field dusting for flea hopper control indicate very good control and large increases in yields this year in experiments conducted by K. P. Ewing and R. L. McGarr at Port Lavaca, Tex. In some tests dusting with sulphur has increased the yield over 500 pounds of cotton per acre and mixtures of sulphur and paris green have given even larger increases. Another factor is that the crop is considerably earlier on the treated areas, which has been very important this year on account of the almost continuous infestation of leaf worms and the damage from boll weevils in late cotton.

Abundance of flea hopper host plant.--Croton spp. or goatweed, the most important host plant for overwintering eggs of the cotton flea hopper, is very abundant this year, according to reports from Mr. Ewing. Observations on a trip by rail from Sweetwater, Tex., via Fort Worth to Houston, showed a large amount, apparently more than usual, on the route through the cotton-growing sections of central Texas.

Cotton root aphids at Florence, S. C.--F. F. Bondy and C. F. Rainwater report that their studies of the brownish purple root aphid of cotton, Rhopalosiphum sp., in the field and insectary show that winged forms will occur under two conditions--crowding of the individuals, and lowering of the temperature. This species was not observed in the fields after July 1, but the green cotton root aphid (Anuraphis maidi-radicis Forbes) and the white cotton root aphid (Trifidaphis phaseoli (Pass)) were found on cotton roots until the second week of July. It is difficult to find any of these aphids on any host plant during periods of hot, dry weather, as they require considerable humidity and cannot be found when there is little moisture in the top soil.

Pink bollworm infestation.--H. S. Cavitt, Presidio, Tex., submits the following data on the pink bollworm infestation in the Big Bend of Texas. Examination of cotton blooms was started in June and continued throughout July. In 1935 a total of 78,000 blooms were examined and 0.742 percent were found infested, as compared to 33,300 blooms examined and 0.069 percent infestation in 1934. Green bolls were used for determining the infestation after August 3, 100 boll samples being examined semimonthly from 22 fields. Above the Conchos River the acreage planted this year was very small, owing to shortage of water. The cotton was early and the infestation started early. By the latter half of September there was 100-percent infestation in the green bolls, as compared to 84 percent in 1934. Below the mouth of the Conchos, where most of the acreage is located, the infestation is lighter, but increased rapidly during August and September. By the end of September it had reached an average of 65 percent, as compared to 40-percent infestation of green bolls in 1934. C. S. Rude and W. T. Gurley report the infestation at Tlahualilo, Mexico, as 93 percent in zoca cotton and 97 percent in plant cotton on September 27. Reports from other parts of the Laguna indicate light infestations in some sections and extremely heavy ones in others.

Pink bollworm in Puerto Rico.--L. C. Fife, Mayaguez, P. R., reports that very few pink bollworms were found in Puerto Rico in August and September, which probably accounts for the absence of infestation in several of the known host plants on the island. The buds, blooms, and seed pods of the following 4 malvaceous plants were examined with negative results: Maga (Montezuma speciosissima), clamor (Thespesia populnea), okra (Abelmoschus esculentus), majagua (Pariti tiliaceum). The only plants actually found infested with the pink bollworm during this period were cotton plants, Gossypium sp. Twenty-one green and 75 open bolls collected on August 22 from 5 wild cotton trees at Corozal when carefully examined showed an exit hole, an empty pupa case, and feeding signs in several open bolls. Between August 28 and September 18, 1,791 bolls of Sea Island cotton were examined, of which 46, or 2.56 percent, were infested. At Isabela no infestation was found in 7 fields and only 1 percent in the eighth field. At Quebradillas 2 fields were examined, with no infestation discovered in 1 and only 1-percent infestation in the other. At Camuy 3 fields showed no infestation, while the other 2 had 5-percent and 12.3-percent infestations on September 18.

Hosts of Microbracon kirkpatricki Wilk.--As previously reported, M. kirkpatricki, one of the pink bollworm parasites imported from Egypt, has been found to readily attack the boll weevil. Further tests by J. W. Folsom and P. A. Glick, Tallulah, La., show that this parasite oviposits readily on the larvae of the cotton leafworm in the insectary. The eggs hatched but the parasite died, apparently unable to penetrate the skin of the host. M. kirkpatricki laid eggs freely and developed normally on larvae of the dipterous Eurosta solidaginis Fitch taken from galls on goldenrod.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Gin-trash inspection.--Gin-trash inspection has continued to go forward satisfactorily, no specimens of the pink bollworm having been found either inside or outside the regulated areas this season. The only regulated areas in which gin-trash inspection has been performed thus far are in southern Georgia and northern Florida. All trash from gins in these areas has been inspected throughout the season. The inspections have also been very intensive at gins closely adjacent to these regulated areas and in the vicinity of designated oil mills to which seed was sent. As the ginning season is drawing to a close,the inspections cannot be continued much longer; however, a supply of green bolls is being obtained for later laboratory inspection. Inspections in Louisiana and Mississippi have been completed. A general inspection of about 1 month was made in the northern half of each State, and green bolls were also collected in areas not covered by the machines. In Texas the machines have continued to work northward and westward, and at the close of the month they were ready to begin inspections in the Western Extension of Texas, both within and outside the regulated area. Another machine is operating in the southern counties of Oklahoma.

Trap-plot cotton in the Big Bend area of Texas.--The remaining trap plot in the Castolon section was worked until September 10 and then discontinued. At that time it appeared that some commercial damage would be done by the insect. Recently, however, a general investigation was made. It so happened that pickers had just gone over the fields, and as there was no open cotton left it was very easy to get an idea of the damage. It is of interest to note that while some damage will probably be done, it will be considerably less than was at first thought. In the Presidio section a few spots in several fields are beginning to show slight damage. It is a little too early to form any definite conclusion as to the degree of damage and the acreage involved. Field clean-up is to be carried on again this fall, and these spots will be cleaned first.

Road-station inspection.--During the month 934 cars were inspected at the Marfa, Tex., road station, and 13 were found to be carrying contraband material. Only one interception was infested by the pink bollworm, this consisting of 18 locks of seed cotton found between the cab and body of a truck. The cotton contained one living larva. As this station has been operated several seasons, excellent cooperation is being received from the public and no difficulty has been experienced with cars passing this station without stopping.

Eradication of Thurberia plants in Arizona.--The destruction of Thurberia plants in the regulated area of southern Arizona has been continued throughout the month with W. P. A. funds. Some 70 men have been at work, but early in October word was received that the remaining equipment had been delivered and the full quota of men would soon be at work. During the month some 10,000 plants were destroyed, which is less than for the few days worked during the latter part of August. When the project was first started the men worked up the canyons where the majority of plants occur, and naturally a considerable number were removed each day. It was soon found, however, that it would be exceedingly difficult to keep an accurate check on the territory covered, and a new method was begun. The men spread out in a line and worked forward to a certain point, then moved over and repeated the operation. By this method an accurate check could be kept, so that no ground was overlooked. A considerable area was gone over during the month, even though not a large number of plants were destroyed.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Special treatments of calcium arsenate decrease its toxicity to southern armyworm.--C. B. Wisecup and J. P. Vinzant, of the Sanford, Fla., laboratory, report that as a result of recent laboratory tests it was shown that calcium arsenate, when prepared at a temperature of 100° C., or when treated in an autoclave for 3 hours at a steam pressure of 150 pounds and a temperature of 180°, showed a definite decrease in toxicity to newly hatched and quarter-grown larvae of the southern armyworm (Xylomeges eridania Cram.), as compared to the basic, normally prepared calcium arsenate. A total of 3,600 newly hatched and an equal number of quarter-grown larvae were used in these tests. Each of the calcium arsenate materials was distributed with a precision dusting apparatus in such a manner that approximately 0.3 mg of dust was deposited per square inch on each surface of sweetpotato leaves before they were exposed to the test larvae.

Autoclaving decreases foliage injury without decreasing toxicity of calcium arsenate to Mexican bean beetle.--As a result of recent field tests,

N. F. Howard and R. H. Davidson, of the Columbus, Ohio, laboratory, report that samples of calcium arsenate autoclaved at 150 pounds of steam pressure for 2 hours were rendered safe on bean foliage, whereas samples of calcium arsenate from the same lot that were heat treated in an electric oven at 180° C. for 2 hours, as well as samples of the basic normally prepared material, injured bean foliage severely. However, there was some indication that the calcium arsenate that was heat treated in an electric oven caused slightly less foliage injury than did the basic normally prepared material. In another series of tests it was demonstrated that the autoclaved calcium arsenate was satisfactorily toxic to the Mexican bean beetle when used at the rate of 1 pound to 50 gallons of water and that a trace of arsenic injury was apparent on some of the plots treated with this material. It is concluded, therefore, that autoclaved calcium arsenate should be used with hydrated lime to provide a proper margin of safety.

Cube dusts superior to derris dusts in laboratory tests against imported cabbage worm in California.--R. E. Campbell, of the Alhambra, Calif., laboratory, reports that in laboratory tests cube dusts have been slightly more toxic to the imported cabbage worm than have derris dusts with an equivalent rotenone content. Talc was used as a diluent in each case, and applications were made with a precision duster at a dosage of 1 g per plant.

Shade-grown tobacco treated successfully for tobacco hornworms.--Recent field experiments conducted by F. S. Chamberlin, of the Quincy, Fla., laboratory, against tobacco hornworms (Phlegethontius sexta Johan. and P. quinquemaculata Haw.) on shade-grown tobacco in the Florida-Georgia tobacco area demonstrated that a mixture of paris green and hydrated lime in the proportions of 1-6 by weight can be applied to the disease-resistant types of shade-grown tobacco at the rate of approximately 4 pounds per acre, with little burning of the tobacco foliage, and that this treatment gave a satisfactory degree of hornworm control, provided the larvae had not passed the third instar. It was shown that this mixture could be applied more uniformly than undiluted paris green and the total quantity required per acre was correspondingly reduced. The "float" method of applying the paris green-hydrated lime mixture was used in these tests. This method involved the application of the dust in the center of the space between the rows of tobacco in such a manner that the dust drifts or "floats" onto the plants, instead of being applied directly.

Imported pea weevil parasites released in Idaho.--T. A. Brindley, of the Moscow, Idaho, laboratory, reports that during September a total of approximately 425 living adults of the pea weevil parasite Triaspis thoracicus Curt. were received at Moscow from the European parasite laboratory at Hyeres, Var, France, through cooperation with the Division of Foreign Parasite Introduction. These parasites originated in Austria. The same day they were received approximately 325 adults were released on a plot of peas badly infested by the pea weevil. The remaining parasites were retained in laboratory cages containing host material in various stages of development in an attempt to obtain pertinent data respecting important phases of their biology.

Biology and control of mole crickets in Florida.--In summarizing biological and control studies on two species of mole crickets, Scapteriscus acletus (R. & H.) and S. vicinus Scudd., J. N. Tenhet, of the Sanford, Fla., laboratory, reports: (1) Mole crickets cannot be reared satisfactorily in small tight containers. A large flowerpot plunged in the soil out of doors gave the best results of any rearing cage tried thus far. (2) Some vegetative shelter seems to be absolutely necessary for the protection of the newly hatched nymphs, as field observations demonstrated that the young nymphs were abundant only where there was a heavy cover crop of weeds, grass, or similar growth. It may be possible to take advantage of this feature in devising control measures for these pests. (3) Young mole crickets apparently cannot develop satisfactorily on a diet composed solely of living vegetation, as their principal food appears to be decayed organic matter. (4) Baiting experiments under controlled conditions in the laboratory demonstrated that under the most favorable circumstances approximately 50 percent of the nymphs feed on various baits. (5) The addition of synthetic cryolite to bait in proportions ranging from 1 to 25 percent of the weight did not appreciably increase the attractiveness of the bait to the mole cricket nymphs.

Possible utility of cultural methods to prevent cabbage webworm injury.--In summarizing results obtained in biological studies on the cabbage webworm (Hellula undalis Fab.), W. A. Thomas states that under conditions existing in the Chadbourn, N. C., district, this insect may complete its life cycle in less than a month during the summer; hence, it appears to be capable of producing from four to five generations during its normal period of occurrence throughout the summer and fall. This definition of generations of the cabbage webworm may lend itself to the establishment of safe planting dates of susceptible crops in order to escape serious infestation by this insect.

Habits of cornfield ant suggest possible method of avoiding injury by strawberry root aphid.--Based on recent field observations, L. B. Reed, Chadbourn, notes that the gravid queens of the cornfield ant (Lasius niger americana Emory) select certain types of vegetation on which to alight and under which to establish new colonies. Crabgrass is found to be particularly attractive for this purpose. On the other hand, only a few queens could be found in pure stands of velvetbeans or sweetpotatoes and none could be found in freshly plowed land bare of vegetation. This suggests the possibility of avoiding severe infestations of the strawberry root aphid (Aphis forbesi Weed), of which the cornfield ant is the most assiduous attendant, by selecting for strawberry planting areas distant from crabgrass and other favored host vegetation of the cornfield ant, and choosing, where possible, sites near velvetbeans, sweetpotatoes, or newly plowed land.

Proportion of sulphonated castor oil important factor in effectiveness of derris sprays against red spider.--C. A. Weigel, of the Beltsville, Md., laboratory, and H. H. Richardson, formerly of this Division, report that tests conducted against red spider mite (Tetranychus telarius L.) at Barberton, Ohio, indicated that a spray composed of derris root powder in water, with a rotenone content of approximately 0.0034 percent, which had not proved entirely effective, showed a marked increase in effectiveness when the proportion of sulphonated castor oil was increased from 1-400 to 1-300. With this proportion, kills of 98.4 percent of the adults and 96.4 percent of the nymphs were obtained.

It was observed that increasing the rotenone content to 0.0052 percent without increasing the proportion of sulphonated castor oil did not appreciably increase the effectiveness. Similar results were obtained when cube root powder in water, containing approximately 0.0095 percent of rotenone, was used with the sulphonated castor oil.

Derris sprays or dusts give best control of cabbage worms in Ohio.--N. F. Howard and R. H. Davidson, of the Columbus, Ohio, laboratory, report that as a result of a series of field tests for the control of cabbage worms on cabbage grown for kraut in the vicinity of Clyde, Ohio, a derris or cube dust containing 0.05 to 0.1 percent rotenone, applied at the rates of from 20 to 25 pounds per acre, gave good control of the imported cabbage worm. It was indicated that three or four applications may be required to obtain control in some instances. Good results were also obtained by the application of derris or cube root sprays containing 0.01 percent rotenone. For the control of the cabbage looper it was necessary to use derris or cube dusts containing 0.4 to 0.5 percent of rotenone, or to use derris or cube root sprays containing 0.015 to 0.02 percent of rotenone. Applications were made every 10 to 14 days after the worms appeared in large numbers. There was no significant difference in the degree of control obtained from the use of derris root or cube root dusts or sprays, provided the rotenone contents of the insecticides were practically equivalent. The addition of spreaders or stickers to derris root suspensions in water applied as sprays seemed to slightly increase the control obtained. Very little difference in the degree of control resulted from the use of a number of diluents for derris or cube dusts. Phenothiazine applied as a dust with talc or applied as a spray was ineffective against the two species of cabbage worms mentioned and this insecticide seemed to injure the plants slightly.

Effectiveness of devil's-shoestrings root against Mexican bean beetle in Ohio.--N. F. Howard and R. H. Davidson, Columbus, report that a mixture of devil's-shoestrings root (Cracca virginiana L.) containing approximately 0.6 percent rotenone, gave satisfactory control of the Mexican bean beetle when used undiluted as a dust or when used as a spray, with a content of 0.01 percent rotenone, on small plots of beans in the field under conditions of heavy infestation.

Nicotine sulphate sprays give promise of control of bean thrips in Colorado.--R. L. Walls, of the Grand Junction, Colo., laboratory, reports that in a recent field test on 12 acres of beans, a 40-percent nicotine sulphate spray in water (1-800) caused a material reduction of the population of the bean thrips on the fourth day after application in a heavily infested field of beans.

INSECTS AFFECTING MAN AND ANIMALS

Screw worm invades grain belt.--As a result of shipments of infested animals from the South into the Northern States, the screw worm fly (Cochliomyia americana Cushing & Patton) gained a foothold in southwestern Illinois and Iowa, and in eastern Missouri. Intrastate shipments of stock and natural dissemination of the fly caused a rapid spread of the pest, and a lack of familiarity of the grain-belt farmers with the insect occasioned a rather severe loss in a comparatively short time. It has been estimated that over 7,000 cases have occurred in Illinois and about 400 animals have been killed. Recent low temperatures, however, have almost entirely stamped out the infestations.

Screw worm cases decrease in Southeast.--In the Southeastern States, particularly the more northern sections, lower temperatures have markedly decreased the number of screw worm infestations. With the approach of winter, the Bureau plans to gradually bring to a close the intensive campaign it has been waging against the pest for the past 5 months. Records obtained in this work up to September 28 show that of the 133,520 cases reported, 46.7 percent occurred in cattle and 43.7 percent in hogs. Of the predisposing causes of infestation, tick bites were responsible for 40 percent, and such practices as dehorning, branding, marking, castrating, and uncontrolled breeding of animals for about 30 percent.

Reports of severe screw worm infestations from Southwestern States.--Reports from the Bureau's Texas laboratories state that an average infestation of all animals in the Edwards Plateau section reached approximately 15 percent, with a mortality rate of 6 percent, 38 percent of the infested animals dying. O. G. Babcock, Bureau representative, is at present making a survey of the pest in New Mexico, Arizona, and California. He states that in New Mexico approximately 17 percent of the animals were infested this year. Reports reaching the Bureau from various sources in California indicate unusual losses there this year from screw worms. Particular mention has been made of eye infestations in feeder lambs.

Stable fly outbreak in Kansas and Nebraska reduces milk production.--According to reports received by John B. Shepard, senior agricultural statistician of the Division of Crop and Livestock Estimates, from numerous dairymen in Kansas and Nebraska, an unusual abundance of the stable fly about the middle of September caused such annoyance to milk cows that milk production fell off from 50 to 75 percent. The animals would not stay in the pastures and owners were compelled to buy extra feed. In many instances the cows had to be kept in the barns 10 days.

Mosquitoes cause death of animals in Florida.--W. V. King, Orlando, Fla., reports that the recent heavy storms in that State have produced very favorable conditions for mosquito breeding, particularly in the Everglades, notorious as a breeding place for the "spotted-legged" mosquito (Psorophora columbiae D. & K.). Around Lake Okeechobee several deaths of animals have been reported as being due to the unusual abundance of this species.

FOREIGN PARASITE INTRODUCTION

Fruit fly parasites to Puerto Rico.--Under the Puerto Rico Processing Tax Fund Project three shipments of fruit fly parasites have been received from O. C. McBride, Honolulu, Hawaii. The records on these shipments are as follows:

Species	Adults forwarded	Adults alive at destination
	Number	Number
Diachasma tryoni Cam. ---------	2,339	1,241
Diachasma fullawayi S. H. -----	174	82
Opius humilis Silv. -----------	191	94
Tetrastichus giffardianus Silv.	1,515	1,111
Total------------------	4,219	2,528

There were also received four shipments of *Opius crawfordi* (Vier.) from A. C. Baker, in Mexico, of which species 2,585 adults were forwarded and 1,012 were alive upon arrival. All living material was liberated in sections infested with *Anastrepha* spp., and extensive oviposition was noted.

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Sixteen larvae of the Mediterranean fruit fly (*Ceratitis capitata* Wied.) were intercepted at San Juan, P. R., on August 7 in a single pear in stores from Spain. Living specimens of the lygaeid *Cligenes picturata* Dist. were taken at Nogales, Ariz., on August 22 and 23 on *Echinocactus nidulans*, *Echinocereus* sp., and *Mammillaria* sp. in cargo from San Luis Potosi, Mexico. Sour limes arriving in ship's stores at San Pedro, Calif., on August 6 from the Philippines, were infested with living specimens of the Philippine orange moth (*Prays citri* Miller). A living larva of the weevil *Liparus coronatus* Goeze was intercepted at Baltimore, Md., on August 18 in a carrot root in stores from Spain. This species is recorded as being found on sugar beet in the Union of Soviet Socialist Republics. A specimen of the Asiatic rice borer (*Chilo simplex* Butler) was found at Chicago, Ill., on July 29 in rice straw used as packing for cargo from the Philippines. This represents our first record of this pyralid being intercepted from the Philippines. A living adult of the pythid *Cariderus planirostris* (F.) was taken at Norfolk, Va., on June 13 in a sycamore log in cargo from France. A larva and some pupae and adults of the mango weevil (*Sternochetus mangiferae* Fab.) were intercepted at Boston, Mass., on June 21 in seeds of mangoes in stores from Colombo, Ceylon. This weevil was taken previously in mango from Ceylon in 1927. Living larvae and adults of the bostrichid *Dinoderus bifoveolatus* Wollaston arrived at New York on July 16 in barbasco (*Jacquinia* sp.) roots in the mail from England. A living specimen of the West Indian sweetpotato weevil (*Euscepes batatae* Waterh.) was intercepted at San Francisco on July 29 in sweetpotato in baggage from Tahiti. Living pupae of *Diatraea grandiosella* Dyar were taken at Presidio, Tex., on July 15 in a green cornstalk in baggage from Mexico. This is the first record in our files of this pyralid being intercepted. A living larva of the weevil *Conotrachelus dimidiatus* Champ. was intercepted at Hidalgo, Tex., on July 26 in a dried guava in baggage from Mexico. Adults of *Eurytoma plotnikovi* Nikolskaja and *Megastigmus pistaciac* Walk. were taken at Washington, D. C., on August 6 in pistache (*Pistacia vera*) seeds in the mail from Tashkent, Union of Soviet Socialist Republics.

Pathological interceptions of interest.--*Didymella* sp. was intercepted at Seattle on April 5 on *Camellia japonica* from Japan. No species of *Didymella* was found recorded as occurring on camellia. The first interception of *Helminthosporium allii* Campanile from Egypt was made on September 10 at Mobile on garlic. The first interception of *H. avenae* Eidam was made on August 24 at San Pedro on oat straw from Japan. *Phoma* sp. was intercepted on April 8 at New York on a globe artichoke from France. This may have been *P. bellynckii* West, but no specimens are avilable for comparison. *Phyllosticta aucubae* Sacc. was collected at New York on March 24 on *Aucuba japonica* plants from California--Stevenson's manual lists this disease as occurring in Italy only. *P. evonymella* Sacc. was intercepted for the first time on May 29 at Seattle on euonymus from Japan. *Phyllosticta* sp. (not any of the species described on the host) was intercepted on April 4 at Seattle on camellia from Japan. The first interception of *Septoria cornicola* Desm. was made at Boston on August 25 on *Cornus canadensis* from Canada. *Septoria* sp. was intercepted on May 23 at Washington on the leaves of *Ceropegia crispata* from South Africa. The fungus is thought to be *Septoria oxypetali* F. Tass. which occurs on a nearly related plant from the same origin, but no *Septoria* has previously been reported on *Ceropegia*. A very interesting fungus of the family *Moniliaceae*, tribe *Hyalosporae*, was found on the roots of *Yucca tremuleana* from Cuba on May 21 at Washington. Studies to date indicate that it may be a species of an undescribed genus. The wheat nematode *Anguillulina tritici* was found infesting a small sample of wheat seed from Turkey examined on June 13 at the Inspection House, Washington, D. C.

More light, more "bugs".--Inspection of ship's stores by flashlight at Mobile revealed infestation of 20 pounds of cabbage. The steward, by request, moved the cabbage to where good light was available and the following insects were collected: *Brevicoryne brassicae* L., larvae of *Ceutorhynchus quadridens* Panz., *Muscina* sp., *Nysius senecionis* Schill., *Oxytelus rugosus* Fab., *Philonthus* sp., *Plutella maculipennis* Curt., and two undetermined insect types.

Japanese beetles at sea.--Luis A. Catoni, chief of the Insular Plant Quarantine Service of Puerto Rico, calls attention to a case of considerable interest from the quarantine viewpoint, indicating how readily some types of insects may be spread long distances. On July 20 the S. S. *San Juan* left New York for Puerto Rico, carrying as stores on her foredeck a pile of potatoes in sacks, presumably having originated in New Jersey. It so happened that this boat carried an entomologist, A. H. Madden, bound for the Mayaguez Experiment Station in Puerto Rico. Shortly after sailing Mr. Madden noticed beetles emerging from the potato pile and flying around the deck. He caught some and immediately recognized them as the Japanese beetle (*Popillia japonica* Newm.). This identification was confirmed by H. L. Dozier. The beetles were in evidence on the ship for 2 days, at the end of which time the potatoes were thrown overboard because of spoilage.

A family tries smuggling in more ways than one.--A Mexican family returning through Nogales from a trip to Mexico offered a small basket of limes as the only plant material they had. The inspector detected the odor of guavas and found 7 under the limes. Two more guavas were found in a jar of sausage. A mango was hidden among some small squares of bacon. The customs inspectress found 2 more mangoes when she searched the woman and older daughter. Five cases were ripped off a pillow that seemed too heavy and 21 bulbs and more guavas were removed. While all this was going on the smaller children were playing outside. A customs inspector noticed a lump on a baby so it was examined and a large mango was shaken out of its clothing.

DOMESTIC PLANT QUARANTINES

Citrus canker unearthed by relief workers.--The recent finding of citrus canker infection in Terrebonne Parish, La., was the direct result of work of relief laborers in clearing out wild growth, according to the inspector working this area, who states that the infected seedlings were growing in the bottom of an arroyo, completely surrounded by an entanglement of wild growth, and might otherwise have remained undiscovered indefinitely. The two infected properties are fortunately not within the commercial area of Louisiana, and this is the only parish in the State now known to be infected with citrus canker. Inspections in citrus-growing regions in Louisiana had yielded no cases of infection since August 1934, when citrus canker was found in this parish. The densely planted jungle nature of the commercial citrus area in Louisiana would present a most difficult problem of eradication should the disease become established there.

Transit inspection resumed at several stations.--With the return of the fall shipping season for nursery stock, transit inspection was resumed on September 17 at Omaha, where several uncertified shipments from the Japanese beetle area have been intercepted. Inspection is also being resumed at Kansas City, Spokane, Seattle, and Portland about October 15, and at Albany, Springfield, Mass., Detroit, Cincinnati, Cleveland, St. Louis, and Atlanta about November 1, in cooperation with States and with other divisions of the Bureau. The inspection of mail, express, and freight shipments is conducted on a year-round basis at Boston, New York, Philadelphia, Washington, Jacksonville, Chicago, and St. Paul, and on a part-year basis at Pittsburgh.

Violations consigned to every State in Union in 1935.--A tabulation of violations intercepted by transit inspectors during the fiscal year 1935 shows that every State in the Union and the District of Columbia would have received shipments moving in apparent violation of Federal domestic plant quarantines but for such interceptions. Approximately 2,041 such shipments were reported, including intrastate shipments from regulated areas. The States to which the greater numbers were en route were, in order named, New York, Illinois, Pennsylvania, Florida, Maine, and Ohio, in or near all of which transit inspection is regularly conducted. The number of violations reported for the different States ranges from 106 to 382.

Garden club chain letter going rounds.--"If you want to join our flower club, send seeds, bulbs, or plants to the top name, No. 1, and place your name at the bottom of the list, omitting name No. 1 and send a card to five of your flower-loving friends. When your name gets to the top of the list, it should have reached 1,000 persons who will send you flower seeds, bulbs, or plants." So reads a garden club chain letter, according to the Wisconsin State Entomologist, who is releasing newspaper stories warning the public against sending uncertified nursery stock in such manner and calling attention to Federal and State plant quarantine regulations which govern the interstate movement of certain plant materials. Transit inspectors find that about 50 percent of the violations are shipped by persons not commercially engaged in the nursery business. Such shipments are more likely to be infested than plants produced in nurseries receiving periodic inspection. The number of letters that come to this Division, however, from persons making inquiry as to shipping regulations, indicates that the general public is becoming better informed as to the existence of plant quarantines.

Results of phony peach survey.--A survey of States bordering on the north of known infected areas, undertaken to determine whether the disease was spreading to the peach-growing areas of this region, has resulted in finding two more infected counties each in Missouri and North Carolina, as well as new infections in Maryland and Kentucky reported in a former number of the News Letter. The additional counties are Stoddard and Dunklin, Mo., and Catawaba and Mecklenberg, N. C., not heretofore classed as infected. The work in Illinois, South Carolina, Tennessee, and Arkansas, all formerly known to be infected, did not reveal any newly infected counties, while the work in New Jersey, Delaware, West Virginia, and Virginia yielded no definite cases of phony peach disease. In the more generally infected area of the Gulf region, intensive inspection and eradication have been carried on both in orchards and in the vicinity of peach-growing nurseries.

Relief work on peach mosaic.--Work in Delta County, Colo., which has been carried on for approximately 2 months, was completed for the fall early in October. It represents a coverage of all peach-growing properties in the county and resulted in finding no peach mosaic infections. In Mesa County, Colo., grove inspection will be continued throughout October, representing a complete coverage of the main commercial orchards of most of the area in which peach mosaic was previously found. Eighty-two relief workers in these two counties were employed on this project, and up to October 1, 251,537 trees were inspected, and 1,001 trees and infected stumps were destroyed. The recent outbreak of peach mosaic in Colorado is recognized as a serious menace in the important peach-producing region along the Colorado River east of Grand Junction, and it is believed the eradication of infected and abandoned trees will aid in preventing the spread of this disease.

Oregon quarantine on narcissus amended.--Certified narcissus bulbs taken from crates or other original containers for reshipment into the State of Oregon in small lots will need to be labeled by the shipper to show that the bulbs were certified at origin, under an amendment dated September 11, 1935, to Oregon quarantine order No. 31 (new series).

BEE CULTURE

Airplane dusting takes heavy toll of bees in California.--The apiaries located in the vicinity of large tracts of tomatoes that have been dusted by airplanes continue to suffer heavily from the effects of poison. The apiary of the Bureau of Entomology and Plant Quarantine at Davis, as well as that of the University of California, also located at Davis, are so depleted in bees as to constitute practically a total loss. Not only have adult bees and brood been killed, but the bees have carried in so much of the poison dust and stored it with pollen that the combs will have to be thoroughly washed and renovated before they can be used again. If the trouble continues it will be impossible to conduct experimental work with bees in the vicinity of Davis. The same situation, of course, holds true in other sections of California where airplane dusting is extensively practiced.

Beekeepers are asking for a laboratory in the North Central States.--At the recent joint meeting of the American Honey Producers' League and the American Honey Institute, held in Detroit from October 7 to 10, much interest was manifested in the possibility of establishing a Government field laboratory somewhere in the North Central States for the purpose of investigating many beekeeping problems with which honey producers are confronted in that region. The American Honey Producers' League unanimously adopted a resolution asking that such a laboratory be established.

Pollen-reserves studies to be extended.--The work of C. L. Farrar and A. P. Sturtevant, of the Intermountain Bee Culture Field Laboratory at Laramie, Wyo., on the use of pollen reserves, is giving such promising results with respect to better wintering and the rapid building up of colonies in the spring that it seems desirable to inaugurate similar work elsewhere. The possibility of producing better crops in southern California through the study of pollen reserves in that section holds considerable hope, and in order to familiarize himself with the methods used in Laramie, F. E. Todd, in charge of the Pacific States Bee Culture Field Laboratory at Davis, Calif., has been visiting, in company with C. L. Farrar, some of the apiaries in Wyoming and Colorado, where the pollen-reserves work is under way.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Cerambycid larvae intercepted in packing-case wood.--Larval specimens of some species of Callidium (probably C. violaceum L.), obtained from packing-case wood from Europe were recently identified by A. G. Boving. The collection was made at Seattle, Wash., in September of the present year, but the cases involved have been in storage in a bonded warehouse since November of last year.

Further distribution in North America of a European weevil.--Specimens of a weevil recently submitted for identification by A. W. Baker, of the Ontario Agricultural College, have been placed by L. L. Buchanan as the European species Sitona cylindricollis Fahr. These specimens were collected at Lindsay, Ontario, in August of this year and, according to Professor Baker, were quite abundant, attacking white clover. The species was first reported in North America at Middlebury, Vt., in 1932.

Rediscovery of an Ashmead braconid.--Among specimens of Hymenoptera received for identification from the Bureau of Biological Survey of the Department, C. F. W. Muesebeck has discovered two specimens, one from Massachusetts and the other from New Hampshire, which agree definitely with the description of Neoblacus rufipes Ashmead, the type example and only known specimen of which has long been missing from its pin in the National Museum collections.

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UNITED STATES

DEPARTMENT OF AGRICULTURE

BUREAU OF
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NEWS LETTER

VOLUME II

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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR OCTOBER 1935

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JAPANESE AND ASIATIC BEETLE INVESTIGATIONS MADE PART OF FRUIT INSECTS DIVISION

Effective November 19, the research work on Japanese and Asiatic beetles, originally carried on as an independent unit reporting direct to the Chief of Bureau, was transferred to and made a part of the Division of Fruit Insect Investigations. This transfer of activities was made because it was not considered good administration for a laboratory to report direct to the Chief of Bureau. The transfer is not intended in any sense as a criticism of the work that has been done or a subordination of the work on the Japanese and Asiatic beetles nor does it mean any demotions or changes in personnel in connection with the work on Japanese and Asiatic beetles.

MUESEBECK HEADS DIVISION OF INSECT IDENTIFICATION

On October 31 C. F. W. Muesebeck succeeded Harold Morrison as leader of the Division of Identification and Classification of Insects. Mr. Muesebeck has been associated with this division as assistant leader and is recognized as one of the highest authorities on parasitic wasps. He has made many important contributions on the classification and habits of these parasites.

Carl Heinrich, well known for his work on adults and larvae of microlepidoptera, has been selected as assistant leader.

Dr. Morrison, who has been in immediate charge of the division since July 1, 1928, will resume his studies on the identification and classification of scale insects, a group on which he is recognized as one of the world's leading authorities.

PROCUREMENTS

Every month the Bureau administrative offices in Washington receive a number of inquiries from the field concerning orders previously placed for supplies and equipment. Even without these reminders, the business offices are painfully aware that too often a period elapses between the placing of an order and the receipt of the goods, which must seem unreasonably long to the field men waiting for the supplies. Based on the standards and practices of a few years ago, such delays would be rather unusual. Prior to the emergency conditions of the past 4 or 5 years, each bureau in the Department maintained a shelf stock of the articles most commonly needed in its operations, and when requests were received from the field it was a comparatively simple matter to pack the necessary supplies and get them off within 2 or 3 days. Likewise, when it was necessary to place an outside purchase order for supplies or materials, the volume of business in relation to the personnel of the purchasing offices was not too large to prevent the immediate handling of the order.

Two major changes have come about which make it impossible to maintain former practices: First, the tremendous increase in the volume and complexity of procurements in the Bureau; and second, the centralization, both in the Department and in the Government service as a whole, of the purchase of ordinary supplies.

As to the increase in business, the Bureau Purchasing Office handled during the 6-month period ended September 30, 1935, approximately 5,000 procurement transactions, all of which involved the preparation of at least one set of papers and many of which included the making up of specifications and other operations of a highly technical nature. In addition to the paper work required, the handling of these transactions necessitated numerous telephone calls and personal contacts with business concerns and with other Government agencies; and at the same time it was essential for the purchasing office to maintain its acquisition and property records, keep the flow of vouchers from vendors moving, and check property returns. It can readily be appreciated that the handling of more than 30 procurement orders a day would be no small task, even if the Bureau were in a position to proceed with the orders directly, without clearance through any other agency. This, however, is not the case, as a large proportion of purchases necessitate contacts with the Central Supply Section of this Department and with the Procurement Division of the Treasury Department. This factor is mentioned with no desire to reflect unfavorably on the centralized purchasing procedure, which has undoubtedly effected economies in the procurement of some types of material. The inevitable effect, however, has been to slow up appreciably the purchasing business of the Government, as it is clearly impossible for any central purchasing unit to anticipate demands that may be placed upon it with sufficient accuracy to have on hand or readily available all the materials it may be called upon to furnish. This situation has been made more difficult by the demands placed upon the purchasing machine by the various new emergency agencies that necessarily had to start from the very beginning in their procurement programs. These demands have in many instances required the negotiation of contracts far in excess of those anticipated at the beginning of the fiscal period, and the burden of work has sometimes made it impossible for the requisitioning departments to obtain up-to-date advice regarding the current contracts on even staple items. In a number of cases the Bureau has been entirely dependent on telephone information as a basis for drawing its requisitions for many items included in the general schedule of supplies but on which no printed schedules were available.

The business offices have no desire to lay the blame for delays entirely at the door of the centralized purchasing system, but the existing situation does involve factors of delay that the average man in the field naturally does not understand and for which he is likely to hold his headquarters' office responsible. Everyone concerned, both in the Department and in the Procurement Division, is doing his best to expedite purchasing transactions, but it is to be expected that certain delays will continue to occur and requisitions from the field should be submitted with that in mind. Although it is obvious that unexpected emergency needs will arise, a little advance estimating will eliminate many requests of the type now submitted on an emergency basis. For example, it is difficult to see why the need for such items as pencils, paper clips, and notebooks cannot be anticipated in time to place the order well in advance of the exhaustion of the current supply.

Two specific complaints with regard to procurements from the Central Supply Section of the Department are so widespread as to deserve special mention. The first is the failure of the present stock list to include prices. The quoting of prices in such a list is not an easy matter. The supply of goods on hand at the beginning of the period covered by one of these lists is practically certain to be exhausted before the list gets into the hands of the field organization and several replenishments on each particular item will, no doubt, be necessary before a new list is issued. There is no assurance that prices will remain constant. At the same time, it has been pointed out to the Central Supply Section that the bureaus, and particularly the men in the field who have to keep within a rather limited allotment, are entitled to some information at the time they place an order as to what the materials will cost. The Central Supply Section has agreed, therefore, to include in its next stock list, which will come out about January 1, a list of estimated prices, with the understanding that the prices are simply the best estimate that can be made and are not guaranteed in any specific instances, although over the group there should be no large variation. This list will be helpful to men in the field in determining not only what the items will cost but whether it is economical to buy them through the Central Supply Section. If the local price on the item is lower than that listed in the catalog, it would clearly be in the interest of the Government for the purchase to be made locally.

The second complaint relates to the frequent necessity for back ordering and the difficulty in keeping track of back-ordered material. It is common for a field station to order half a dozen items and to receive shipment containing only four items, with the notation on the enclosed requisition copy that the other two are out of stock but will be back ordered. On receipt of such a notice, the field man wonders whether he should reorder the material and how he will know, when he gets it, that it represents shipment on the previous order and not delivery on some new order that may have been placed. The answer to the first question is that it will not be necessary to reorder, as the Central Supply Section automatically places the back order on items it cannot fill on the current requisition. If the need for this material is so urgent that the field office cannot wait for supplemental shipment, it can of course make local purchase in sufficient quantity to meet immediate needs. As to the second question, with every back order shipped there is enclosed a copy of the Central Supply Section's back order, indicating on its face that this shipment is a back order and giving the number of the original requisition. Through the use of this requisition number there should be no difficulty in checking up the order originally placed.

The field man's "Bible", with regard to purchasing, might include the following commandments: (1) Place orders as far as possible in advance of your ordinary needs. (2) Order in sufficient volume to avoid the placing of numerous small requests, which multiply paper work and increase shipping costs. (3) If it is impossible to order items by stock, catalog, or other identification number, give as full a description as possible of the items desired and indicate any known source of supply. This will materially aid in the handling of the order. (4) Limit emergency requests to real emergencies that cannot be anticipated in time to handle procurements through the normal procedure. On the other hand, if a real emergency does arise, do not hesitate to order any items needed, explaining the circumstances so that the Bureau may determine whether or not there is justification for proceeding without competition in case the amount of purchase exceeds $50. (5) Give the Bureau and the Department the benefit of any doubt as to whether or not your order is being handled as promptly as circumstances will permit. The Washington office is just as anxious as is the field organization to have procurements handled promptly, and when delays occur they are, in nine cases out of ten, due to some condition over which the Bureau has no control. (6) When inquiring as to delayed orders, give a specific description of the original order. This is particularly necessary for a large station that may have several similar orders in the process of being handled at the same time. (7) Do not hesitate to make to the Bureau any suggestions that you think would be helpful in improving purchasing procedure and practices. While it may not be possible to adopt your idea because of laws or administrative policies, suggestions from men actually in the field are always welcome and many of them have proved very helpful.

The foregoing discussion applies primarily to regular activities. Procurements on W. P. A. projects are handled largely through the regional offices of the Procurement Division. When W. P. A. orders are delayed, the matter should be taken up with the regional office handling it. If results cannot be obtained in that way, the Bureau will make inquiries of the Procurement Division in Washington.

FRUIT INSECT INVESTIGATIONS

A second generation of the peach borer.--This season Oliver I. Snapp and J. R. Thomson, of the peach-insect laboratory at Fort Valley, Ga., found that with a small proportion of the population of this insect two generations may occur in 1 year. Nursery stock was artificially infested on July 15 and 17 and moths emerged from these trees on September 30, having completed their larval, prepupal, and pupal periods in a total of 75 days. All of the second-generation adults reared were undersized. Fertile second-generation eggs were laid by these moths. Although a few moths emerged from normal nursery stock, most of this emergence may have been forced by a lack of food. It is not known whether any peach borer adults emerged the same year the larvae hatched, from orchard trees under normal orchard conditions.

Phenothiazine for codling moth control.--Preliminary reports on the results obtained with phenothiazine in the control of the codling moth have been received from E. J. Newcomer, in charge of the Division's field laboratory at Yakima, Wash. The data obtained are as follows:

Orchard	Lead arsenate 3-100			Phenothiazine 4-100		
	Apples			Apples		
	Per box	Wormy	Stung	Per box	Wormy	Stung
	Number	Percent	Percent	Number	Percent	Percent
Villmann------	70	14.0	40.0	85	5.6	2.1
Harrington---	97	8.1	37.7	112	3.6	1.8
Ewer----------	144	10.0	30.3	166	3.9	1.2
Average----	104	10.7	36.0	121	4.4	1.7

The fruit on the trees sprayed with phenothiazine was somewhat smaller than that on the trees sprayed with lead arsenate. There was a slight difference in color, the ground color being a deeper green and there being somewhat less red than on fruit sprayed with lead arsenate. A pressure test showed 17.4 pounds for apples sprayed with phenothiazine and 17.0 pounds for apples sprayed with lead arsenate. No injury was evident on the Rome variety nor on the few Jonathans or the Winter Nelis pears. Two Winesap trees and a few Delicious trees in one orchard showed a little marginal foliage injury. The fruit on the Winesaps was quite small.

Preservation of fruit fly larvae.--James Zetek, Panama Canal Zone, reports that he has tested methods of preservation and has found a very successful one for preserving fruit fly larvae, which is as follows: Living larvae are kept in water until ready to be fixed. To nine parts of water, add one part of saturated, aqueous solution of picric acid, bring to the boiling point, decant the water from the vessel containing the larvae, and pour in the hot picric acid-water solution. Leave the larvae in the fixing solution until it cools (about 1 hour). Decant fixing fluid from the larvae, wash them several times in tap water, and preserve in a 70-percent solution of ethyl alcohol. The picric acid tints the larvae a pale yellow. The color makes the spiracles stand out sharply and is of advantage in photographing the larvae. If the alcohol becomes yellow it should be decanted from the specimens and fresh alcohol should be added. If the pale-yellow color is not desired, hot water can be used as a fixing solution instead of the picric acid solution.

Population studies of Japanese beetle in areas of early infestation.--Henry Fox, Moorestown, N. J., states that, as in other years, the area of continuous infestation exhibits local accelerations in its general outward expansion, owing to its meeting and fusing with certain secondary areas of spread near its periphery. The main local infestations instrumental in enlarging the area of continuous infestation were those developed in the general vicinity of New York City and Brooklyn; at Reading and Lancaster in Pennsylvania; between Havre de Grace and Aberdeen, Md.; and at Dover, Del. In 1935 the area of continuous infestation was estimated to occupy approximately 11,400 square miles, distributed by States as follows: New Jersey, 6,460; Pennsylvania, 3,100; Delaware, 670; Maryland, 480; New York, 690. This is a total increase of 1,700 square miles within the year.

Field study of milky disease.--S. R. Dutky, Moorestown, reports that in May 1935 field test plots were established near Shiloh, N. J., to determine the possibility of artificially disseminating the milky disease of Japanese beetle larvae in the spring. A survey during the fall of 1934 failed to reveal any indication of the milky disease in the vicinity where the plots were established. During May 3,000 healthy third-instar larvae collected from this region were injected with a saline suspension of the spores of the causal organism. The inoculated larvae were then used to infest the test plots. On October 14, 1935, the plots were examined and out of a total of 621 larvae collected, 25, or 4 percent, showed the milky disease.

Experimental infection of larvae with fungous disease.--S. R. Dutky, Moorestown, states that when healthy larvae were dusted with the spores from a fungous culture isolated from diseased larvae collected in the field, and then placed in tightly stoppered shell vials, humidified with moist cotton plugs, and held at 86° F., they developed brown lesions in the cuticula and died within 3 days. As the vials contained no soil or other ingestible material, it is likely that the spores penetrated either by way of the spiracles or directly through the cuticula. Among undusted larvae used as controls there was no mortality for a week. Larvae placed in vials containing soil inoculated with fungous spores likewise developed the fungous disease, while larvae placed in vials containing uninoculated soil were alive and healthy after 12 days. Spores from another fungous culture isolated from field-infected Japanese beetle pupae produced infection in both third-instar Japanese beetle larvae and third-instar larvae of Autoserica castanea Arrow, and similarly fungous spores from cultures isolated from Autoserica pupae produced infection in third-instar larvae of both Japanese beetle and Autoserica. There are slight cultural differences between the two organisms, especially in the readiness of sporulation.

Penetration of lead arsenate in New Jersey soils.--A study has been completed by W. E. Fleming, F. E. Baker, and L. Koblitsky, all of Moorestown, of the penetration of lead arsenate into three New Jersey soils. The purpose of this study was to determine the relationship between penetration of lead arsenate in different soil types and its toxicity to grubs. A series of studies was conducted at Moorestown from 1929-1932 on sassafras sandy loam, Penn shale loam, and Lakewood sand, the insecticide being applied at depths of 3, 6, and 12 inches. When lead arsenate was applied at a depth of 3 inches there was a slow loss of arsenic from the surface layer of the sassafras sandy loam and the Penn shale loam, and no significant difference in the rate of loss in these soils. The loss from the surface layer of the Lakewood sand was practically twice as rapid as in the other soils. When the arsenate was applied at depths of 6 and 12 inches in the sassafras sandy loam and in the Penn shale loam, a balance was established between the surface layer and the lower layers and there was a definite tendency of the arsenic to accumulate at the surface. Lakewood sand had little ability to retain lead arsenate and there was no indication of arsenic accumulating at the surface. It seems logical to think of arsenic fixation in soils as a change from the soluble to the relatively insoluble forms, and the establishment of a slowly changing equilibrium in which there is a tendency for the more soluble or more readily available forms to change to the less soluble and less available forms. As the power to fix arsenic is undoubtedly associated with the amount of the finer separates, namely, silt, clay, and colloidal matter in the soil, such types of soil as Lakewood sand, which are practically lacking in these constituents, naturally have a low fixing power for arsenic. In the soil of commercial nurseries in New Jersey there is a tendency for the arsenic to establish a balance between the surface and the lower layers and to become fixed to a large extent in the surface layer. No injury occured to smartweed plants growing on sassafras sandy loam or Penn shale loam, even when there was a significant increase of arsenic in the surface layer by migration from the lower layers. Plants on the Lakewood sand were severely injured by arsenic, in spite of the rapid reduction in the concentration of the material in the surface layer. The concentration of soluble arsenic in the soil is a more reliable index of arsenic toxicity to plants than is the concentration of total arsenic in the soil.

Protection of truck crops from injury by the larvae.--F. E. Baker, Moorestown, reports that the vegetables planted in soil treated with paradichlorobenzene during the summer of 1935 have been harvested. Tomatoes, eggplants, and sweetpotatoes, although retarded in growth when first planted, produced normal crops when dosages of 200, 400, and 600 pounds per acre were applied, even when planted on the day of treatment. The yield of lettuce was decreased with all dosages where this crop was planted immediately after the soil treatment. When planting was delayed 5 and 12 days, respectively, the lettuce produced proportionately more in the treated plots, but still showed a decreased yield with all dosages. Carrots were practically killed in soil containing 400 and 600 pounds of paradichlorobenzene per acre, and the harvest was considerably decreased in soil containing 200 pounds per acre, not only when planted on the day of treatment but also when planted 5 days later. When planting was delayed for 12 days the only significant decrease in yield was obtained in the 600-pound plot. The yield of onions was decreased in the 200-pound plot, and this vegetable also failed to grow in the 400- and 600-pound plots when planted on the day of treatment. The plantings made on the 5th and 12th days after treatment failed to grow in the untreated plot, therefore they had to be disregarded.

Absorption of arsenic by forest-tree seedlings.--W. E. Fleming, F. E. Baker, and L. Koblitsky, Moorestown, report that in determining the quantity of arsenic absorbed by nursery plants growing in plots treated with lead arsenate, the roots and tops of various seedlings grown in soils treated with lead arsenate at concentrations ranging from 500 to 1,500 pounds per acre, were analyzed for arsenic. The seedlings were planted in pots in the greenhouse in December 1934. The pots were plunged outdoors in the spring of 1935. They were taken up for analysis in September, and the arsenic assimilated in parts As_2O_3 per million by the various varieties is shown in the following table.

Seedling	Soil	Parts As_2O_3 per million after treatment with $PbHAsO_4$ per acre					
		500 lbs.		1,000 lbs.		1,500 lbs.	
		Tops	Roots	Tops	Roots	Tops	Roots
Pinus caribaea	Clayton, N. C.	12.93	78.80	19.90	97.30	24.83	99.30
Do	Clayton, N. C. + 10% cow manure	11.08	63.00	12.33	95.00	15.66	67.00
Do	Georgetown, S. C.	16.25	78.75	18.75	79.37	20.93	93.75
Do	Georgetown, S. C. + 10% cow manure	20.00	73.75	31.25	81.75	31.25	87.50
Do	Camden, S. C.	27.18	98.33	35.67	101.66	35.93	118.33
Do	Camden, S. C. + 10% cow manure	33.75	65.00	26.66	96.16	45.83	100.00
Do	Moorestown, N. J.	7.50	28.00	23.10	60.00	31.25	72.50
Do	Moorestown, N. J. + 10% cow manure	15.65	60.87	16.90	89.00	18.15	93.75
Pinus jeffreyi	Moorestown, N. J.	23.80	75.00	26.30	96.30	31.20	143.80
Pinus ponderosa	do.	31.21	62.49	43.82	83.33	32.33	162.50

MEXICAN FRUIT FLY

Fruit shipments from lower Rio Grande Valley.--The fruit-shipping season opened on October 10. By the end of the month 506 cars had been shipped by rail and 172 equivalent carloads had moved by truck. Oranges constituted only 5 percent of the total.

Fruit flies trapped.--Twenty-two adult Anastrepha ludens Loew were trapped on 21 premises in the valley in October. Other Anastrepha spp. were trapped as follows: A. pallens Coq., 178; A. serpentina Wied., 11; A. fraterculus auct., 8. Although intensive inspection was made on all properties on which fruit flies were trapped, no fruit was found infested.

DATE SCALE CONTROL

No scale found.--During October a number of palms in the High School, Indio Heights, and West Side districts in the Coachella Valley, Calif., were inspected and no scale was found. The Indio Heights and High School districts are now considered free from scale and no further work is contemplated. No more inspection will be necessary in the West Side district, but infested properties and properties where valueless palms have been dug out will be checked for volunteer plants. In the Imperial Valley the Reed Garden was inspected from ground and ladders and no scale was found. During the inspection all bushy palms were pruned. No scale has been found on this property since February 1934. Scouting for unlisted palms was continued.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Notes on parasites of wheat insects.--C. C. Hill, Carlisle, Pa., reports that Pleurotropis benefica Gahan, the most important parasite of the black grain stem sawfly (Trachelus tabidus Fab.) in the United States, was recovered this summer in Lima, Ohio, by E. J. Udine. P. benefica is fairly abundant in the eastern half of Pennsylvania but has failed to keep pace with the rapid increase in numbers of its host in western Pennsylvania and eastern Ohio, where its presence was doubted until the recovery was made at Lima. Heterospilus cephi Rohwer, the principal American parasite of a wheat-stem sawfly, Cephus pygmaeus Linn., has been steadily increasing its range of distribution, along with its host. It was recovered this year for the first time from Cumberland, Lancaster, and Bucks Counties, Pa. In that State it had previously been found only in Lycoming County. Rearings of hessian fly material from points in Jefferson County, N. Y., show a distinct northern limit of effective parasitization by Platygaster zosine Walk. Extensive rearings showed from 0 to 0.31 percent parasitization by this species in that locality, as compared with an average of 20 percent parasitization farther south in the State.

Pea aphid in Pacific Northwest.--L. P. Rockwood, of the Forest Grove, Oreg., laboratory, reports that on October 17 and 18, alfalfa fields and sweetclover on ditch banks near Toppenish and Mabton in the Yakima Valley, Wash., were swept for aphids by L. P. Rockwood and Max M. Reeher. Aphids were moderately abundant but were all one species, namely, Illinoia pisi Kalt. The same was true in the Walla Walla Valley, Wash., and in the Columbia Valley in east-central Oregon. It is remarkable that no Illinoia creelii (Davis) was found in these localities, particularly in the Yakima Valley.

Unrecorded host plants of I. creelii (Davis).--A few years ago Sadie E. Keen, formerly of the Forest Grove, Oreg., laboratory, found I. creelii on several leguminous host plants that have never before been recorded in the literature. The records were all made in western Oregon, especially in the seacoast region. These hosts are:

Lathyrus sp., Forest Grove, Oreg., June 14, 1923; Portland, Oreg., June 19, 1923; May 24, 1924; and June 9, 1926.
Lathyrus maritimus, Seaside, Oreg., June 25, 1923; May 8, 1924; October 29, 1925; October 28, 1926.
Lathyrus littoralis, Seaside, Oreg., June 25, 1923; October 29, 1925.
Lathyrus sulphureus, Forest Grove, Oreg., April 14, 1928.
Trifolium fimbriatum, Seaside, Oreg., October 27, 1923.
Vicia americana, Seaside, Oreg., May 8, 1924; October 29, 1925.
Alsike clover, Seaside, Oreg., October 29, 1925.
White clover, Seaside, Oreg., October 29, 1925.
Red clover, Seaside, Oreg., October 29, 1925.

Control of corn borer by varietal characteristics.--L. H. Patch and G. T. Bottger, of the Toledo, Ohio, laboratory, report as follows: "It appears that a reduction of about 40 percent of the borer population could be effected by planting corn of later maturity, and a reduction of about 25 percent could be effected by planting corn in which eclosion of the tassel is delayed. By planting corn that takes full advantage of the growing season in the locality concerned (generally of later maturity), and which has been bred for delayed-tassel eclosion, it appears that reductions up to 35 or 40 percent in the borer populations could be effected."

European corn borer reduces yield of sweet corn seed.--Morris Schlosberg and Ralph Mathes, Toledo, Ohio, report results based on data obtained in 1934 from experiments conducted with five varieties of sweet corn near Toledo. Each variety was tested independently at four different rates of borer population in the plants laid in four-fold replication in a Latin square. The reductions of usable sweet corn seed per acre per borer per plant are given in the following table.

Variety	Mid-silk date	Yield in absence of borers	Reduction per borer per plant	
		Pounds per acre	Pounds per acre	Percent
Purdue Bantam--------	July 21	1,783.7 ± 125.9	56.8 ± 13.2	3.8 ± 0.74
Stowell's Evergreen--	July 28	1,741.2 ± 83.9	80.6 ± 21.3	4.63 ± 1.22
Late Mammoth----------	August 4	1,672.7 ± 81.2	103.4 ± 22.0	6.18 ± 1.32
Bantam Evergreen-----	July 30	1,566.2 ± 43.3	106.5 ± 9.9	6.80 ± 0.63
Country Gentleman----	July 31	1,668.1 ± 54.7	139.5 ± 21.4	8.36 ± 1.28
Generalized result for all varieties--	---------	1,628.6 ± 37.1	74.2 ± 6.8	4.56 ± 0.42

JAPANESE BEETLE CONTROL

Soil poisoning completed in St. Louis and Indianapolis.--Application of lead arsenate to two new Japanese beetle infestations in St. Louis, begun on August 8, was completed on October 8. From September 27 until completion of the work, the spraying was done with labor supplied by the State. Approximately 100 acres were sprayed at the rate of 1,000 pounds of lead arsenate per acre. On October 9 application of the insecticide to the soil in areas outside of the treated section in Indianapolis in 1934 was begun. Two Federally owned sprayers were shipped to Indianapolis from the New Cumberland warehouse and the two that had been in St. Louis were driven to Indianapolis. In addition to an extension of the area treated in 1934, two other points of infestation were sprayed. Approximately 20 tons of lead arsenate were applied at the rate of 1,000 pounds per acre. Labor for the Indianapolis project was furnished by the F. E. R. A.

Many azaleas treated with paradichlorobenzene.--During a 10-day period in mid-October, approximately 7,200 azaleas were treated by the recently approved paradichlorobenzene method.

Temporary inspectors added to gypsy moth force.--Owing to increased inspection demands, it has been necessary to employ 19 temporary inspectors. No evidence of gypsy moth infestation has been found in the Connecticut nurseries inspected. Twenty-seven lots of evergreen boughs in southern Vermont and 6 in western Massachusetts have been inspected with negative results. It is estimated that approximately 1,000 tons of evergreen boughs will be cut and baled on the lots that have thus far been inspected.

Gypsy moth road inspection started.--Funds for the maintenance of a gypsy moth vehicular road patrol were recently made available from the emergency appropriation for gypsy moth control. Twelve stations--3 in Massachusetts and 9 in Connecticut--are scheduled for operation over a period of 7 months.

Evergreen inspection starts in New England.--Cutting of evergreen boughs and Christmas trees was under way by the middle of October in the northern sections of New England. Five temporary inspectors were hired on October 14 and assigned to evergreen-bough inspection in Vermont. On the same date one inspector was assigned to the inspection of evergreen wreath material at a large processing plant at Westminster, Vt.

First-record corn borer infestations.--Corn borer scouting performed during October with W. P. A. funds resulted in the finding of first-record infestations in 89 towns and townships in 5 States. Twelve towns in York County, Maine, were found infested for the first time. In New Jersey first-record infestations were discovered in 1 township each in Atlantic, Camden, Cape May, and Sussex Counties, 2 townships each in Middlesex, Monmouth, Salem, and Passaic Counties, 3 townships in Hunterdon County, 4 townships each in Morris and Warren Counties, 12 townships in Bergen County, and 17 townships in Burlington County. Michigan first-record infestations comprise 6 townships in Allegan County, 2 in Berrien County, 8 in Ottawa County, and 3 in Van Buren County. In Wisconsin first-record finds were made in 5 townships in Manitowoc County. With the last-named record, infestations have been found in the entire County of Manitowoc. One first-record find was recorded in Northampton County, Va. The regular town survey work was completed early in October in New Hampshire, Vermont, Rhode Island, and Connecticut. Special surveys were then started throughout New England.

Dutch elm disease eradication.--Confirmation was received of a third Dutch elm diseased tree at Brunswick, Md. All known confirmed trees in Connecticut have been eradicated. At the end of October there were only 38 confirmed trees standing in the entire area and most of these were recent confirmations on which State officials had not obtained permission for eradication.

FOREST INSECT INVESTIGATIONS

Inventory of pine beetle damage nears completion.--F. P. Keen, of the Portland, Oreg., laboratory, reports that the first general survey of western pine beetle damage in Oregon and Washington was undertaken this fall in cooperation with the Forest Service. Five crews of three men each, employed by the Forest Service early in August, covered 3,000,000 acres of National Forest and private pine lands by the middle of October. Counts were made of beetle-killed trees on 2,000 miles of strip, and careful analyses were made of insect damage on 102 320-acre plots. Similar surveys were made by the Indian Service of the pine forests on Indian reservations of the two States. Technical supervision of these surveys was provided by the Bureau of Entomology and Plant Quarantine and the work of compiling the data is now nearing completion at the Portland laboratory.

Douglas fir bark beetle active in northern Washington.--Mr. Keen states that during the annual fall survey of check plots on the Chelan National Forest, group killing by Dendroctonus pseudotsugae Hopk. was prevalent. Infestation is of two types. The first and more normal type is confined to the poor sites where numerous trees are dying as the result of mistletoe, flatheaded borer, and Douglas fir bark beetle activity, usually a combination of the three. The second and more serious situation is found along the stream bottoms in sites where relatively large groups of good quality Douglas fir are being killed. These infestations are practically all caused by D. pseudotsugae and, in all observed cases, they center around firs that had been broken by snow or wind.

Parasites of hemlock sawfly may be used against European spruce sawfly.--R. L. Furniss, Portland, reports that an extensive infestation of Neodiprion tsugae Middleton has been present on western hemlock in central Oregon for the past 3 years. Heavy defoliation occurred in 1934 but this was very considerably reduced in 1935 by the activity of several species of parasites. Itoplectis montana Cush., normally parasitic on lepidopterous pupae, was found to be particularly effective. Some 7,800 sawfly cocoons were collected in September and forwarded to the New Haven, Conn., forest-insect laboratory. Fall emergence of parasites was at its height at the time of shipment. The life history and habits of the parasites are to be worked out to determine whether any can be used against the European spruce sawfly (Diprion polytomum Htg.) which has recently become very destructive in the Northeastern States and Canada.

Melrose Highlands laboratory moved to New Haven.--R. C. Brown reports that during the month the laboratory dealing with introduced forest insects was moved from 1156 Main St., Melrose Highlands, Mass., to 56 Hillhouse Ave., New Haven, Conn. The building at New Haven was formerly the residence of President Dwight of Yale University. It has been offered rent-free by the University for use as station headquarters and laboratories for the forest-insect investigations in the Northeast. The Forest Service and the Division of Forest Pathology, of the Bureau of Plant Industry, are occupying similar residences in New Haven, also owned by Yale University.

European spruce sawfly.--H. J. MacAloney, New Haven, reports: "Two examinations of the plantations of the New Haven Water Company at Wepawaug Reservoir, Orange, Conn., were made in October--one the first week and the second on October 21. On the latter date the thin appearance of the branches, caused by feeding of the European spruce sawfly, was noticeable. The collection of early stage larvae on October 21 suggests the possibility of more than two generations of this species in Connecticut. This is further suggested by the fact that flies emerged on October 23 from cocoons collected at Kent, Conn. On October 25 these flies began laying eggs, which hatched in 5 days. One hundred cocoons from Grand Cascapedia, Quebec, have been placed in jars, with soil and litter added, in a constant-temperature room at the Agricultural Experiment Station."

Sawfly on red pine.--J. V. Schaffner, Jr., reports regarding Neodiprion sp., which defoliated 12 acres of red pine in June at Marlboro, Mass., that emergence of adults had practically ceased by the end of October. It is of interest to note that the males outnumbered the females by about 12 to 1. This is explained by the fact that the female larvae feed over a longer period than do the males, and that complete defoliation occurred just before the majority of the female larvae matured; also, a lead-arsenate spray was applied on the trees that were not completely defoliated, just before the larvae reached maturity. The larvae of this sawfly feed during May and June, at a time before the current year's growth has progressed very far. Thus practically all of the feeding is confined to the old needles. This apparently explains the fact that no mortality of pines has occurred at Marlboro in 1935.

Experiments with parasites of hemlock sawfly.--P. B. Dowden, New Haven, reports: "On September 30 a collection of 7,896 Neodiprion tsugae Middleton (hemlock sawfly) cocoons, made at Sweet Home, Oreg., on September 24, 25, and 26, arrived at this laboratory. The cocoons were sent by F. P. Keen in order that we might obtain the parasite Itoplectis montanae Cush. and experiment with it as a parasite of D. polytomum. The cocoons arrived in excellent condition and both host and parasite adults started issuing immediately. Up to the present the following adults have been recovered: N. tsugae, 929; I. montanae, 759 (334 males, 425 females); Hemiteles tenellus (Say), 50; Thysiotorus sp., 29; cryptine (two spp.), 18; chalcidoid, 40; tachinid, 7. I. montanae readily attacks exposed D. polytomum cocoons, laying a large internal egg in the overwintering larva. Development of the early larval instars of the parasite has been noted, and a total of 1,007 cocoons have been attacked at the laboratory. Unfortunately, the parasite does not seem to seek out unexposed cocoons. D. polytomum forms its cocoon in the forest litter. When these conditions were simulated by covering 10 cocoons with about 1/4 inch of dead spruce needles, not a single cocoon was attacked.

The larch sawfly and its parasites.--J. C. Evenden, of the Coeur d'Alene, Idaho, laboratory, reports that early in October 4,000 larch sawfly (Lygaeonematus erichsonii Htg.) cocoons were collected from the infested area on the North Fork of the Flathead River, Mont., and shipped to R. C. Brown, New Haven, Conn., for rearing. This project is being conducted to determine the species of parasites already present, as well as the percentage of parasitization in 1935, this information being essential in planning for the institution of biological control.

The satin moth in Washington.--R. T. Webber is now stationed at the Morristown, N. J., laboratory, after having spent a portion of the year investigating the status of the satin moth in Washington and Oregon, with headquarters at Puyallup. Four species of hymenopterous parasites and one tachinid fly parasite were included in the introductions of the past several years. *Apanteles solitarius* (Ratz.) and *Meteorus* sp., had become established and the *Apanteles*, especially, had spread over a large part of the territory infested by the satin moth. From collections of satin moth caterpillars made this year numbers of the tachinid *Compsilura concinnata* Meig. were obtained, and Mr. Webber also found that another of the hymenopterous parasites, *Eupteromalus nidulans* (Thomson), an enemy of the hibernating caterpillars, has become established.

Dispersion of elm bark beetles.--R. R. Whitten, Morristown, is conducting an experiment to obtain information on the dispersion of the elm bark beetles *Scolytus multistriatus* Marsh. and *Hylurgopinus rufipes* (Eich.) in an elm-free area in New Jersey. Elm wood infested with the two species was placed at a central point, and freshly cut noninfested elm logs were put at various distances on lines radiating from this point, to act as trap logs for beetles emerging from the infested material. In a preliminary report on this experiment, Mr. Whitten states that *H. rufipes* adults have been found boring into trap logs 1/2 mile from the central point.

Repellents of elm bark beetles.--Mr. Whitten and W. C. Baker, Morristown, report on an experiment in which elm logs were sprayed with various mixtures which, it was thought, might repel the smaller European bark beetle (*S. multistriatus*) and which might be used to prevent such logs from acting as breeding places. After the logs were sprayed, they were exposed to attack by the beetles. The materials used were: Coal-tar creosote and fuel oil, 1-3 by volume; cresol and fuel oil, 1-3; pyridine and fuel oil, 1-3; paradichlorobenzene dissolved in fuel oil; and lime-sulphur concentrate and water. No mixture gave complete protection, but the results obtained with coal-tar creosote and fuel oil and with cresol and fuel oil show that these materials, at least, merit further study.

Control of Douglas fir beetle.--Artificial control measures were instituted in September to combat an epidemic of the Douglas fir beetle (*Dendroctonus pseudotsugae* Hopk.) within the Douglas fir stands of the Cody Canyon, Shoshone National Forest, Wyo. This project will be continued throughout the winter, the labor being supplied from a winter C. C. C. camp located in the center of the infested area.

GYPSY AND BROWN-TAIL MOTH CONTROL

Emergency labor aids in moth control.--Up to October 15, 1935, under the W. P. A. emergency projects, the following numbers of workers were employed under the gypsy moth project in the different States: Maine, 43; New Hampshire, 43; Vermont, 314; Massachusetts, 392; Rhode Island, 69; Connecticut, 448; New York, 158; New Jersey, 73; Pennsylvania, 707; total, 2,247. On the same date, under the W. P. A. emergency project, the numbers employed on brown-tail moth work were as follows: Maine, 38; New Hampshire, 80; Massachusetts, 242; total, 360. During the last week in September over 1,600 men from C. C. C. camps were employed on gypsy moth work in the area east of the barrier zone, this being the highest number recorded up to that time. During 1 week in September over 72,000 new gypsy moth egg clusters, most of which were in Massachusetts, were creosoted by C. C. C. men. This indicates the intensity and the seriousness of the infestation, especially in the Massachusetts towns, which are located between Worcester County and the Connecticut River.

PLANT DISEASE CONTROL

Blister rust found in Lagrange County, Ind.--Blister rust was found on Ribes cynosbati and R. americanum in Lagrange County on September 20 by R. A. Sheals, of the Division of Domestic Plant Quarantines, and F. F. Franklin, of the Division of Plant Disease Control. Specialists of the Division of Forest Pathology of the Bureau of Plant Industry, who examined a specimen of this find, have verified the identification of the disease as the white pine blister rust. This makes two infected counties in Indiana, infection having been reported in September in La Porte County.

W. P. A. workers engaged in blister rust control.--In the week ended November 2, 4,401 W. P. A. workers were employed on blister rust control work throughout 28 States. Of this number 4,057 were from relief rolls and 344 nonrelief. The Ribes-eradication season has been completed for this year in some sections of the country, owing to the defoliation of the plants and the appearance of snow and freezing weather. In other sections Ribes eradication will continue as long as field conditions permit effective work.

Spread of blister rust in Maryland.--An examination of blister rust infected areas in Maryland indicates that the rust first became established on native white pines about 1924 in Garrett County. Since then it has been spreading to other counties but, owing to the 3-year incubation period of the fungus on white pines, the extent of its distribution on white pines is only now becoming apparent. Within the last 3 years 17 pine-infection centers have been found, ranging from a few trees to 25 acres in extent. Eleven of these centers are located in Garrett County, 4 in Allegany, 1 in Washington, and 1 in Frederick. Infection on Ribes has been found in 1 location in Montgomery County, 2 in Frederick, 2 in Washington, and 5 in Allegany, while in Garrett County it is found to be generally distributed, about 60 percent of the Ribes that were eradicated in control areas this fall being infected.

COTTON INSECT INVESTIGATIONS

Hemipterous insects on cotton in Arizona, summer of 1935.--Horace G. Johnston, employed for 3 months last summer, has reported on the relative abundance of species, seasonal distribution, host relationships, and other similar factors affecting the hemipterous-insect populations of cotton fields in Arizona. Forty-four species of hemipterous insects were collected. At least 15 of these species, either directly or indirectly, affect cotton production. They were divided according to their feeding habits into the boll-feeding group, the square- or bud-feeding group, and the predators. The boll-feeding group includes in order of their importance the following: Euschistus impictiventris Stahl., Chlorochroa sayi Stahl., Thyanta custator

Fab., *Dysdercus mimulus* Hussey, *Euryophthalmus succinctus* Linn., and *Chlorochroa ligata* Say. The square-feeding group includes 5 species of Miridae which, in the order of their importance, are: *Lygus hesperus* Knight, *Psallus seriatus* Reut., *Parthenicus* sp., *Creontiades femoralis* Van D., and *Rhinacloa forticornis* Reut. *Corizus lateralis* Say and *C. hyalinus* Fab. are probably responsible for injury to large squares just before blooming, causing a proliferation of cells, deformed corolla lobes, and a growth of yeast within the deformed blooms which destroys the stamens and anthers. The 5 most abundant predators were: *Geocoris sonoraensis* Van D., *Nabis ferus* Linn., *Zelus socius* Uhler, *Zelus renardi* Kolo., and *Orius insidiosus* Say. All of the important species of hemipterous insects were at least equally as abundant in the Yuma Valley as in the Buckeye Valley. *P. seriatus* and *D. mimulus* were not found in the Parker area and none of the other species were abundant in this area. In the Safford area *D. mimulus*, *E. succinctus*, *Lygus pratensis oblineatus* Say, and *C. femoralis* were not found on cotton. *C. sayi* and *T. custator* were quite abundant in some fields in this area, but the other species were quite scarce. *P. seriatus* was practically absent in cotton fields, although it was extremely abundant on *Croton texensis* nearby. *C. ligata* was more abundant here than elsewhere. Average populations in the Tucson area were even smaller than in the Safford area. Conditions were much the same as at Safford, especially in regard to *P. seriatus*. The life histories of *E. impictiventris*, *C. sayi*, and *T. custator* were studied for the purpose of identifying the egg and nymphal stages. The entire cycle of *E. impictiventris* required a minimum of 31 days, a maximum of 49 days, and an average of 40 days. *C. sayi* required a minimum of 42 days, a maximum of 65 days, and an average of 53 days. *T. custator* required a minimum of 32 days, a maximum of 42 days, and an average of 37 days. The life-history studies were made under rather unfavorable conditions, with the maximum temperature averaging nearly 108° F. and the minimum around 66.5°. Eggs of these 3 species were collected to determine the percentage of parasitization. Of 761 eggs of *E. impictiventris*, 54 percent were parasitized by *Telenomus* n. sp. Of 659 eggs of *C. sayi*, 46.9 percent were parasitized by *Telenomus mesillae* Ckll. Of 227 eggs of *T. custator*, 35.3 percent were parasitized by *T. mesillae*. The percentage parasitized in the field was probably considerably higher than these records indicate. Work was started too late in the season to determine seasonal importance of all the wild host plants. Information obtained in June, July, and August indicated that for *C. sayi*, the weed *Atriplex semibaccata* R. Br., which grows abundantly on canal banks and around alfalfa fields, is the most important host. Eggs, nymphs, and adults were found on this plant. *Malva parviflora* L. was the next most important species but is less favorable as a host than *Atriplex*. For the cotton flea hopper, *Sphaeralcea emoryi variabilis*(Cockl.) Kearney is the most important host in this region during the early part of the season. It occurs more or less abundantly throughout the State on sandy soils in abandoned fields, canal banks, roadsides, and washes. Most of the plants reach maturity and die by the middle of June but some plants in favorable locations remain partially green and continue to bloom all summer. *Croton texensis* (Klotzsch) furnishes an abundant food supply for flea hoppers during midsummer and autumn. It occurs rather abundantly in the eastern part of the State, becoming more abundant toward the northeastern part. It grows primarily on sandy soils and is seldom found on the heavier soils near streams. Only a small number of plants were found along the Gila River near Buckeye. *Malva parviflora* is the most important host plant of D. mimulus. Nymphs and adults were found abundantly on this weed, especially in alfalfa fields or other places where the ground is partially shaded. The prostrate habits of the plant make it especially suitable for the nymphs, which prefer to remain on or near the ground. Sphaeralcea emoryi variabilis (Cockl.) Kearney is also an important host plant of Corizus lateralis Say in the early part of the season. Both nymphs and adults were found abundantly on it. Other wild hosts of less importance were found for several of the insects. Determinations of Hemiptera were verified by H. G. Barber, determinations of the egg parasites Telenomus spp. were made by C. F. W. Muesebeck, and the plants were determined by R. O. Peebles, of the Bureau of Plant Industry at Sacaton, Ariz.

Tests for boll weevil control at Tallulah, La.--R. C. Gaines, M. T. Young, and G. L. Garrison report unsatisfactory and erratic results from boll weevil control test plots at Tallulah this year. Although the weevil infestation was heavy at the beginning of the season, the damage was light in most fields because the weevils were held in check by hot, dry weather during the entire fruiting season. In 8 of 33 tests greater yields were made in the untreated than in the calcium-arsenate-treated plots, probably owing to slight variations in soil fertility. The tests were made on 1-acre plots and were replicated 3 times. The special calcium arsenates prepared by the Division of Insecticides did not appear to be better than commercial calcium arsenate. The average gains secured from the special arsenates Nos. 1, 3, 4, and 5 were smaller, and the average gains from Nos. 2 and 6 were slightly larger than from commercial calcium arsenate. The average yields from derris diluted with sulphur to 0.5 and 1.0 percent rotenone indicate that this mixture had little if any value. Phenothiazine mixed 1 to 9 with sulphur gave an increase in yield of 17.5 percent, as compared to 23.7 percent increase in the comparable calcium arsenate plots. The yields from calcium arsenate in which the arsenical content was decreased by diluting with lime and increased by adding 10 and 25 percent paris green all averaged lower than the comparable tests with the straight calcium arsenate. Results from the tests of applying calcium arsenate at 4-, 6-, and 8-day intervals and in the early morning, midday, and late afternoon were not conclusive. The average increase per acre this year for the 33 plots with the regular calcium-arsenate treatment was 153 pounds of seed cotton, or 11.3 percent. The increased yield for the past 16 years has averaged 343 pounds, or 28.8 percent.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Gin-trash inspection.--Gin-trash inspection has been continued throughout the month in the regulated areas of Florida and Georgia and in the nonregulated area around Dothan, Ala., where a considerable quantity of seed is shipped. Inspections in the remainder of the nonregulated sections in Alabama, Florida, and Georgia were discontinued about the middle of October. This season over 23,000 bushels of trash was examined in these States, about 6,650 bushels being from the regulated areas. Gin-trash inspection has also gone forward satisfactorily in the regulated portion of the Western Extension of Texas and adjacent territory. About 25 man-days of field inspection was performed in October in the vicinity of the old infested fields in Alachua and Columbia Counties, Fla., and Berrien County, Ga. The material in the fields was sufficient for adequate inspection. The results of all inspections this season have been negative. The only areas where pink bollworms have been found this season are the El Paso Valley of Texas and the Juarez Valley of Mexico, where incidental examinations of trash have been made by regulatory inspectors, and in the Big Bend section of Texas and Mexico.

Field clean-up in Big Bend.--Preparations have been made for cleaning the fields in the Big Bend of Texas again this season. Because of limited funds only the fields showing the largest pink bollworm populations will be cleaned, the expense being borne jointly by the State and Federal Departments. Actual cleaning was begun the first of November and it is believed that all of the fields containing nonpickable cotton will be cleaned before frost.

Road-station inspection.--During October, 13 of the 1,067 cars inspected at the Marfa, Tex., road station were found to be carrying contraband material. Only 1 of the interceptions was infested, this consisting of 22 locks of seed cotton lodged between the body and the cab of a truck. An inspection of this material disclosed two living pink bollworm larvae.

Eradication of Thurberia plants in Arizona.--The remaining equipment for carrying out the eradication of Thurberia plants was received early in October, and the full quota of men immediately put to work. The clean-up is now being carried on in the Tortillita Mountains, located north of Tucson. Estimates are that there are approximately 138,000 acres in this range, and even though several thousand acres are so located that one would hardly expect to find Thurberia plants, it will be necessary to go over the entire acreage sooner or later. Thus far, 13,440 acres have been cleaned and 42,429 plants removed.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Insecticide tests against pea aphid.--Reporting on tests conducted from August 16 to September 24, J. E. Dudley, Jr., of the Madison, Wis., laboratory, states that sprays consisting of derris root powder containing 0.0148 percent rotenone in water, applied before the peas became infested, delayed damaging pea aphid infestations for approximately 1 month. Forty-three days after treatment the sprayed vines were in an appreciably better condition than were the untreated vines. Derris dusts containing 0.5 percent of rotenone, applied at the time of original infestation, showed no significant reduction in the final infestation or in foliage condition, as compared to the check plots. Heavy applications of the derris spray, made when the pea aphid infestation was beginning to be apparent, resulted in an excellent control of the aphid from a commercial standpoint for a period of approximately 1 month and the treated vines produced an excellent crop of pods. In one test derris dust containing 0.5 percent of rotenone, applied in the absence of wind, gave excellent control. After the pea vines became heavily infested, the application of derris sprays containing 0.0148 percent rotenone reduced the aphid population approximately 95 percent, in comparison with untreated plots, and resulted in a profitable yield of peas. Derris sprays containing 0.0022 and 0.0011 percent rotenone, respectively, reduced the aphid population approximately 94 percent. Most of the derris sprays were applied with commercially prepared sulphated phenyl phenol (1-600), which functioned as a spreader and wetting agent. In comparative tests with this spreader and wetting agent, sodium lauryl sulphate (1-1,500), and sodium oleyl sulphate (1-600) no significant difference could be determined in the performance of the three materials. Derris sprays without spreaders or wetting agents caused slower but eventually as good reductions in aphid populations as when spreaders and wetting agents were used. Derris dust containing 0.5 percent of rotenone applied in a heavy infestation gave erratic results, inferior to those from the derris sprays.

Status and host plants of three pod borers in Puerto Rico.--L. B. Scott, of the laboratory at Mayaguez, P. R., reports that during October a survey of the entire coast and many of the agricultural areas in the interior of the island was completed. Examinations were made in approximately 150 fields of native beans, all of which were infested by the pod borer *Maruca testulalis* Geyer. The most severe infestations by this pod borer were found in the vicinity of Isabela, on the north shore of the island, where some of the fields were totally destroyed, and in the areas surrounding Yauco on the south shore, where all of the fields examined were damaged. All infestations found thus far in white, red, and lima beans have been confined to *M. testulalis*; however, this insect has not been found in the wild crotalaria (*Crotalaria incana* L.) or in cowpeas (*Vigna unguiculata* (L.) Walp.). Occasionally specimens of *M. testulalis* were found in the "beach" or bay bean (*Canavalia maritima* (Aubl.) Thou.). On several occasions white beans and cowpeas were found growing in adjacent fields with the former infested exclusively by *M. testulalis* and the latter infested exclusively by the lima bean pod borer (*Etiella zinckinella* Treit.). Another species of pod borer, *Fundella cistipennis* Dyar, was found in limited numbers in "sword beans" (*Canavalia ensiformis* (L.) DC.).

Efficiency of insecticides against raspberry fruit worm.--S. E. Crumb and associates, Puyallup, Wash., report the following results obtained in 1935 in tests against *Byturus unicolor* Say on Marlborough and Cuthbert raspberries, loganberries, and youngberries: (1) Best results were obtained by applying a spray consisting of 4 pounds of lead arsenate and 4 pounds of hydrated lime to 100 gallons of water at the peak of beetle emergence, approximately 2 or 3 weeks prior to blossoming, followed by a second application of the same spray just before blossoming, with a third application of a derris root powder spray containing 0.01 percent of rotenone 2 weeks after blossoming. (2) The omission of the first or second spray of lead arsenate decreased the percentage of control. (3) In general, sprays gave better results than dust. (4) The application of a derris root spray containing 0.01 percent of rotenone in the third spray, gave results superior to those obtained by a nicotine sulphate spray(40 percent of nicotine) 1-400. (5) Tests with bentonite and hydrated lime as diluents for lead arsenate indicated that the former was slightly superior in its insecticidal properties to the latter. (6) Applications of zinc arsenite dust to loganberries resulted in severe injury to the plants. (7) Rather severe damage was caused to Marlborough raspberries in one field by the second spray of lead arsenate. (8) Satisfactory results were obtained by substituting barium fluosilicate for lead arsenate at the rate of 4 pounds to 100 gallons of water in the first two sprays.

Small proportion of paris green with lime controls tobacco hornworms.--F. S. Chamberlin, of the Quincy, Fla., laboratory, reports that in recent experiments for the control of the hornworms Phlegethontius sexta Johan. and P. quinquemaculata Haw., a dust mixture composed of 1 part of paris green and 6 parts of hydrated lime by weight is preferable, from the standpoint of insecticidal efficiency and tolerance of the tobacco plants, to dust mixtures containing these materials in the proportions of 1-4 and 1-5, respectively. The control obtained by the 1-6 mixture was equal to that from lead arsenate and hydrated lime (5-3). These experiments also showed that the applications should be begun in sun-grown tobacco when the infestation reaches an average of 2 or 3 larvae per 100 plants.

INSECTS AFFECTING MAN AND ANIMALS

True screw worm does not breed in cold-blooded animals.--Experiments carried out by E. F. Knipling and B. V. Travis at the Valdosta, Ga., laboratory indicate that Cochliomyia americana Cushing and Patton does not infest wounds in certain cold-blooded animals. Flies placed on wounds in gopher terrapins, alligators, and king snakes refused to oviposit until a piece of cotton saturated with wound discharges from warm-blooded animals was placed near the wound in the reptiles. All newly hatched larvae of the fly placed in the wounds in the reptiles died at the end of the second day without any development.

Flight range of C. americana.--In a series of tests conducted by H. E. Parish at Menard, Tex., to determine the flight range of the true screw worm fly, the greatest distance of travel of this species so far determined is 9 miles. Large numbers of marked flies were released at a certain point and the distance of flight was checked by capturing the marked specimens that came to wounded animals at various distances and directions from the point of liberation of the flies.

Sheep apparently more susceptible to screw worm infestation than goats.--Preliminary experiments being carried on by Messrs. Knipling and Travis, indicate that at certain seasons of the year and under certain conditions wounds in sheep are more attractive to C. americana than are similar wounds in goats.

Pine tar oil a good repellent for Gulf coast tick.--Homer Hixson, of the Valdosta, Ga., laboratory, has found that pine tar oil used alone is effective in keeping ticks Amblyomma maculatum Koch out of the ears of animals for approximately 10 days. The addition of cottonseed oil to the pine tar oil appears to decrease the repellent action of the latter.

Immature stages of Gulf coast tick can survive low temperatures.--C. N. Smith, Washington, D. C., has found that unengorged nymphs and larvae of the Gulf coast tick are able to survive temperatures as low as -4° F. for 24 to 48 hours. Such exposure, however, reduces the proportion of ticks able to successfully engorge.

Beneficial effects of allantoin being confirmed.--The remarkable healing effect of allantoin, a chemical secreted by fly larvae, in the treatment of a wide variety of nonhealing, discharging human wounds is being amply confirmed by doctors throughout the United States. This simple chemical, which was discovered in the secretions of surgical maggots by William Robinson, Washington, D. C., is now being manufactured chemically and used on a large scale, instead of using maggots. Research is being continued to broaden the usefulness of this material and to study its characteristics, also to find other chemicals of a healing nature in maggot secretions. The interest and cooperation of the medical profession in this research is a very valuable factor and is much appreciated.

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Six living larvae of the Mexican fruit fly (Anastrepha ludens Loew) were taken at New Orleans on September 19 in an orange in quarters from Guatemala, and 14 living larvae of this fruit fly were found at New York on October 4 in an orange in baggage from the same country. These larvae represent our first records of this fruit fly being intercepted from Guatemala. Eight living larvae of the Mediterranean fruit fly (Ceratitis capitata Wied.) were taken at San Pedro, Calif., on August 8 in a grape in passenger's baggage from Hawaii, the first record in our files of this fruit fly being intercepted in grape from Hawaii. Larvae of the pink bollworm (Pectinophora gossypiella Saund.) arrived at Baltimore, Md., on August 18 in seed cotton in the mail from Turkey. Previous interceptions of this insect from Turkey were made in 1924 and 1925. The coccid Chrysomphalus mimosae (Comst.) was intercepted at Miami, Fla., on September 27 on hog plum (Spondias sp.) in baggage from the Bahamas. A living adult of the nitidulid Colopterus posticus Er. was taken at Galveston, Tex., on July 29 with banana debris in cargo from Mexico. Living larvae and pupae of the olethreutid Zeiraphera ratzeburgiana Ratz. arrived at Boston on June 27 in spruce tips in the mail from Canada. A living adult of the brenthid Opisthenoxys ochraceus Kleine was intercepted at San Francisco on August 20 beneath the bark of a log in cargo from the Philippines. Adults of the bruchid Bruchus atomarius Linn. were taken at Washington, D. C., on February 12 in seeds of Lathyrus montanus in the mail from Denmark. Two living larvae of Conotrachelus aguacatae Barber arrived at Mobile, Ala., on August 22 in the seeds of two avocado fruits in stores from Honduras. This represents the first record in our files of this weevil being intercepted from Honduras. A living larva of the weevil Cholus cattleyae Champ. was intercepted at San Juan, P. R., on August 29 in an orchid (Cattleya sp.) plant in cargo from Venezuela. A living larva of the cerambycid Dihammus luxuriosus Bates was taken at Seattle, Wash., on June 25 in a branch of Fatsia sp. in ship's quarters from Japan. A. G. Boving states: "This species, according to Kojima (Jour. Col. Agr. vol. 11 (1931), p. 296), attacks varying kinds of food plants (Abies, Aralia, Fatsia, Kalopanax, and Tilia), and its mode of attack varies in the different kinds of food plants. The species is of wide distribution in Japan and is injurious." Living specimens of Thrips validus Uzel were intercepted at Philadelphia on August 5, 1934, on lettuce leaves in ship's stores from Denmark, and on August 10, 1934, in a cabbage in stores from Belgium. This thrips is not known to occur in the continental United States.

Correction.--In News Letter for September 1, 1935 (vol. 2, no. 9, p. 18) adults of Euspermophagus gossypii (Chev.) were found in 1934, not in 1924.

Pathological interceptions of interest.--*Anguillulina pratensis* (de Man) Goffert was intercepted on October 19 at Seattle in a potato from Manchuria, the first interception from that country. *Bacterium citri* (Hasse) Jehle was intercepted at San Pedro on September 28 on sour limes from Japan. *Beauveria globuliferum* (Speg.) Pic. was very much in evidence on a dead insect (Hemiptera) from Mexico, intercepted on September 16 at Galveston, the first interception of the genus. *Chrysomyxa* sp., perhaps *C. chiogenis* Diet., although not listed as occurring on *Vaccineum*, was intercepted at Detroit on October 5 in lingonberries from Newfoundland. *Colletotrichum glycenes* Hori, first interception, was found on soybean pods from Japan on October 12 at Baltimore and *C. pisi* Pat. was intercepted from Cuba for the first time on August 27 on peas at New York. The first interceptions of *Gloeosporium olivarum* were made on August 29 and September 21 on olives from Italy, at New York. The first interception of *G. pelargonii* Cke. and Mass. from Germany was made on September 15 at New York, the host being geranium cuttings in baggage. *Heterosporium echinulatum* (Berk.)Cke. was intercepted on carnations from Mexico for the first time on October 31 at Brownsville, Tex., airport. The first interception of *Phyllachora cynodontis* (Sacc.) Niessl. was made at New York on September 18 on Bermuda grass from Spain. The first interception of *Phyllosticta colocasiae* v. Hoeh. was made on September 30 at New York on *Dieffenbachia seguine* in baggage on S. S. *Haiti*, origin unknown. *Puccinia cynodontis* Lacroix was intercepted from Spain for the first time on September 18 at New York on Bermuda grass. *Sclerotium oryzae* Catt. has been intercepted at New York on rice straw from several countries, mostly new to our interception files, including Australia, Brazil, China (2), India (6), Japan (2), Morocco, Portugal, and South Africa. *Septoria divaricata* E. & E. was intercepted for the first time October 31 at Buffalo on *Phlox paniculata* from Canada. The first interception of *Sphacelotheca cruenta* (Kuehn) Potter from Mexico was made on October 5 at Nogales in broomcorn seed found in a broom.

Larva in soil.--A larva, taken from soil about the roots of some Japanese iris plants brought from Japan by a passenger who arrived at Seattle on October 14, was determined as *Serica* sp.

Garbage cans attractive to inspector.--In inspecting vessels, Inspector Jose A. Ramos, of Philadelphia, finds that the galley, the pantry, and the garbage cans are ideal hunting grounds for prohibited material. As an example, he cites his recent experience on a vessel where the chef was peeling apples. An examination of the refuse en route to the garbage pail revealed the presence of 7 living larvae and 15 living pupae of *Ceratitis capitata* Wied.

Unknown weevil in palm seed.--Weevils were found in a mail shipment of palm seed from the Gold Coast of Africa when inspected at Washington. The specialist reports on these as follows: "This weevil belongs to some genus not represented in the Museum collection and unknown to me. The characters place the species in the vicinity of *Ithyporus*, a genus found in Africa and Madagascar and somewhat allied to our *Conotrachelus*. As far as can be ascertained by an incomplete examination of the literature, the genus is undescribed."

DOMESTIC PLANT QUARANTINES

State quarantine officers witness inspection at Chicago.--A demonstration of actual inspection of packages of plant materials passing through the Chicago Post Office Terminal was given the visiting representatives at the conference of State quarantine officials on November 5. B. M. Gaddis and J. M. Corliss, of the Division of Domestic Plant Quarantines, conducted the 16 officers over a transit inspector's regular tour, and they saw the interception of plants moving to western States without the inspection required under Federal quarantines and without State nursery inspection certificates. Postal officials accompanied the group and showed how postal clerks hold out plant shipments for inspection, and turn back violations to senders when requested to do so. The visitors were also familiarized with the manner of inspecting freight consignments through cooperation of railway agents in providing information through waybills and phone calls on shipments of restricted materials, making it possible to obtain almost 100 percent inspection.

Amendment to Terminal Inspection Act discussed at Eastern Plant Board meeting.--The recent bill proposing to amend the Terminal Inspection Act was explained by Mr. Gaddis at the meeting of the Eastern Plant Board at Baltimore on November 13. The purpose of the proposed amendment is to provide authority to turn back shipments of plant material consigned in violation of State plant quarantines.

More citrus canker infections.--Citrus canker was recently found at Killona, La., in Saint Charles Parish, bordering on the Mississippi River, this being the second parish in the State in which the disease has been found this season. The 650 infected Citrus trifoliata were promptly destroyed by relief workers. The 34th property in the Galveston, Tex., area found infected with citrus canker since the beginning of the calendar year, was recently reported by the supervisor of one of the relief crews destroying abandoned citrus trees. The infection, which appeared on a tree near Alta Loma, was very light. Continued inspections are made in counties bordering on the Galveston area, the counties of Brazoria, Harris, Chambers, Jefferson, Liberty, Hardin, Matagorda, and Galveston having been worked since the first of July. Further inspections in the lower Rio Grande Valley have revealed no canker. Relief workers in the valley have eradicated 1,227,701 citrus trees, principally old abandoned nursery stock. The removal of such growth, it is believed, will be a great aid to orchards in this important citrus-growing area. Thus far in the current year, citrus canker has been found in only 3 of the 21 counties in Texas in which the disease had been located since its outbreak in this State in 1916.

Phony peach relief work.--Over 3,250,000 peach trees have been removed since the early part of August, and over 2,000 workers are now employed under an emergency Federal works project for phony peach disease control, according to Mr. Gaddis, in a talk before a meeting of the Eastern Plant Board at Baltimore on November 13. A brief history of the disease was given, as well as its present status and the proposed activities to be covered by the emergency appropriation act. "Within 2 years after the beginning of the campaign to eradicate the phony peach disease in the heavily infected area of

Georgia and Alabama", Mr. Gaddis stated, "it was found that numerous orchards that had been thoroughly cleaned up were being reinfected from some outside source. Surveys and careful scouting around such plantings brought to light the presence of infected escaped peach trees growing near the orchards. These wild trees were serving as reservoirs of reinfection for the commercial orchards. It is evident, therefore, that the disease cannot be controlled permanently in the orchards unless it is also controlled on its wild hosts. Eradication work in Alabama, Arkansas, Georgia, Illinois, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, and Texas will be conducted during the remainder of the fiscal year, at least, and should accomplish much toward effectively controlling the disease and retarding its spread."

Results of phony peach survey in Illinois and Indiana.--State inspectors of Illinois report that the phony peach disease was found in Richland County this season for the first time. Nine counties in Illinois had been found infected, in previous years. In Indiana a cooperative reconnaissance of 18 commercial orchards disclosed no phony peach infections.

Thurberia weevil quarantine violated.--Rarely, if ever, have shipments been found moving in violation of the Thurberia weevil quarantine, which restricts the interstate movement of cotton and other articles from the regulated area in southeastern Arizona. A few cuttings of the cotton plant were, however, recently intercepted at Chicago by State inspector Glenn E. Moore, and turned back to the sender, who, the project leader found, was unaware of the embargo.

Ohio issues blister rust regulations.--Five-leafed pines may be shipped intrastate in Ohio only when grown in Ribes-free zones, under regulations established by the State Director of Agriculture, effective October 15. The zone requirements are similar to those of the Federal quarantine relating to white pine blister rust. Ohio nurserymen growing five-leafed pines in insufficient quantity to establish such zones are required to abandon the growing of this species, and pines purchased for redistribution from premises not Ribes-free must not be held for sale on such premises during the season when the rust is spreading from Ribes to pines. The European black currant is declared a public nuisance. State forests and municipal parks now growing white pines in a sufficient quantity are declared white pine-growing areas, and currant and gooseberry plants may not be grown within 900 feet of them. Control areas may be established for a distance of 900 feet from native or planted white pine areas and for a distance of 1,500 feet from nursery plantings "which have sufficient value to warrant such classification."

BEE CULTURE

Supersedure work under way.--With the appointments of Otto Mackensen as Junior Apiculturist at Baton Rouge, La., and Allen W. Woodrow as Junior Apiculturist at Laramie, Wyo., active work has been begun under the appropriation made by the last Congress for work on the supersedure of queens. In the South a study will be made on the effect on supersedure of various conditions of queen rearing, while in the North a study will be made to determine what conditions within the colony after the queens are introduced affect supersedure. The work on supersedure at Laramie will be under the direct supervision of C. L. Farrar, who has been relieved of some of his former duties through the appointment of Mr. Woodrow. Under the present program, some 200 queens furnished by the southern field laboratory this fall were introduced by Mr. Farrar in colonies of bees in the apiaries of various cooperators in Colorado.

Pollen reserves in northern Colorado are insufficient.--Mr. Farrar reports that, unless an early spring provides pollen for the bees in northern Colorado, the colonies in that territory will probably not be at a favorable strength at the beginning of next year's honey flow.

Washington, D. C., asks for beekeepers' convention.--An effort is being made by officials of the Chamber of Commerce to have the American Honey Producers' League and the American Honey Institute hold their annual convention in Washington in the fall of 1937. Inasmuch as the beekeepers have never met in Washington, considerable interest has been aroused over the prospects of holding their annual convention in this city.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Larvae of rare weevil added to National collections.--A. G. Boving has identified as Agasphaerops nigra Horn specimens of weevil larvae collected from Lilium longiflorum bulbs at Bandon, Oreg., and submitted for identification by C. F. Doucette on October 8. This weevil appears to be a rare species. It was not previously represented, in the larval stage, in the collections of the National Museum.

Another European weevil in North America.--Six specimens, collected by W. W. Baker on June 1, 1935, at Bellingham, Wash., have been identified by L. L. Buchanan as Ceutorhynchus assimilis Paykull, a European species not previously reported from North America. Another specimen of the same species is at hand from Vancouver, British Columbia, having been taken on May 28, 1931, by H. B. Leech. C. assimilis has been called the "cabbage shoot weevil" in Europe, and is reported in European literature as injuring various cruciferous plants.

Additional U. S. distribution records for a European clover weevil.--Specimens of the European Sitona cylindricollis Fahr., a species first discovered in North America in 1932 at Middlebury, Vt., and later at Shelton, Conn., and Lindsay, Ontario, have been identified by L. L. Buchanan from material received recently from Framingham, Mass., and Ottawa, Ontario. W. J. Brown, of the Canadian Department of Agriculture, reports that the species has been present for a number of years in the more southern parts of Ontario and Quebec.

A European parasite of the clover leaf weevil in United States.--The first American occurrence of the ichneumonid Bathyplectes tristis (Grav.), a European parasite of the clover leaf weevil (Hypera punctata Fab.), was recorded when two specimens, reared October 7, 1935, at Arlington Farm, Va., by F. F. Dicke, were identified as that parasite by R. A. Cushman. These specimens came from host material collected on Arlington Farm.

Best

Japanese parasite of oriental fruit moth established in United States.--Mr. Cushman has recently identified as the ichneumonid *Dioctes molesta* Uchida specimens reared from field-collected material of the oriental fruit moth (*Grapholitha molesta* Busck) from Massachusetts, New York, Virginia, Michigan, Ohio, and Tennessee. This appears to indicate definite establishment in the United States of this parasite which was introduced from Japan to aid in the control of *G. molesta*.

First record of unusual parasite genus in America.--A specimen taken at Philadelphia in banana cargo from Guatemala by Inspector A. B. Wells has been identified by C. F. W. Muesebeck as a new species of the rather remarkable hymenopterous genus *Odontacolus* (family Scelionidae, subfamily Baeinae). This little-known genus of parasites had previously been recorded only from the Australian and oriental zoogeographical regions. The only species for which a host has been recorded is said to be a parasite of spider eggs.

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